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SELECTED ECONOMIC ASPECTS OF THE HEALTH CARE SECTOR IN ONTARIO

R. D. FRASER

A STUDY FOR
THE COMMITTEE ON THE HEALTHCARE SECTOR
1972



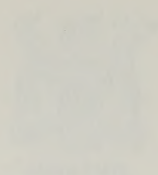


ONTARIO

SELECTED ECONOMIC ASPECTS OF THE HEALTH CARE SECTOR IN ONTARIO

R. D. FRASER

**A STUDY FOR
THE COMMITTEE ON THE HEALING ARTS
1970**



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FOREWORD

The Committee on the Healing Arts was established by the Province of Ontario, Order in Council 3038/66, dated July 14, 1966.

In February 1967, the Committee commissioned Professor R. D. Fraser of the Department of Economics, Queen's University, in Kingston, to undertake a study on the selected economic aspects of the health care sector. The following is a study prepared by Professor Fraser and submitted to the Committee in December 1967, with some of the statistical data updated in the spring of 1969.

The statements and opinions contained in this study are those of Professor Fraser, and publication of this study does not necessarily mean that all the statements and opinions are endorsed by the Committee.

I. R. Dowie, Chairman

H. Krever

M. C. Urquhart

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The research assistance of Mr. John McGuire, Mr. Geoffrey Thornburn, Mr. William Scarth and Mr. Douglas Patriquin is much appreciated. A large part of the material contained in Chapters 7 and 8 was initially assembled and drawn up by Mr. McGuire, that in Chapters 6 and 9 by Mr. Thornburn, and that in Appendices I and II by Mr. Scarth.

As a large part of the data came from unpublished sources, acknowledgement must be made, and thanks given, to many individuals, professional organizations and government bodies. This acknowledgement applies especially to the suppliers of the data on health manpower presented in Appendix I.

R.D.F.

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Chapter 1 Introduction

Man . . . naturally loves to imitate what he sees others do, which is the reason that savage people all do the same thing: this hinders them from ameliorating their condition, though they are always wishing for it: but if one will wholly apply himself to the making of bows and arrows, whilst another provides food, a third builds huts, a fourth makes garments, and a fifth utensils, they not only become useful to one another, but the callings and employments themselves will in the same number of years, receive much greater improvements, than if all had been promiscuously followed by every one of the five.¹

The provision of health care is a classic economic problem.² Human and non-human health care resources are scarce; thus it is necessary to choose which of many health goods and services to produce; and, as an added complication, there generally are alternative ways of combining one or more scarce health care resources to provide particular health goods.

This scarcity of health care resources reflects the general scarcity of resources in the economy at large. At any one time there is a given amount of land, a given stock of human and non-human capital, and a given level of technology. Even if resources were organized in the most efficient way, the sum total of all those resources could not produce enough goods to satisfy all the wants of all individuals.³ Therefore choices must be made between the production of houses and schools, hospital beds and Lincolns, and so on.

Any particular solution to the economic problem of providing health care may be described in terms of the structural organization of the health care sector, of which there appear to be three major aspects. First, there is the general system of allocating resources to and within the health sector; second, the institutional

¹Bernard de Mandeville, *The Fable of the Bees: or, Private Vices, Public Benefits* (1729), Part II, p. 335 as quoted in Adam Smith (Edwin Cannon, ed.), *The Wealth of Nations*, Random House, New York, 1937, p. 3, 1n.

²If much of the following is similar to a lecture in introductory economics, the author makes no apology, for it will be seen that a large part of the behaviour of individuals in seeking health care or providing it is explicable in terms of simple economic theory. A satisfactory solution to the economic problem of allocating resources to and within the health sector thus seems to require consideration of the economic aspects of the nature and structural organization of health care resources.

³Scarcity thus derives from the basic nature of human beings; it is assumed that their wants are insatiable.

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framework of licensing procedures and accompanying regulations, and educational requirements; and third, the traditional practices and patterns of providing health care which characterize the health care sector. These three aspects define the economic structure of the health sector for the purposes of this study. Together, they determine in a large measure the kinds of health care resources, the types of health goods and services, and the ways in which resources are combined to produce health care within an economy.

Of the three major aspects of the structural organization of the health sector, the most important is the general system of resource allocation; for it provides a relative evaluation of different health goods and services and thereby an evaluation of health care resources. The resulting prices determine in large part the composition and distribution of the bundle of health goods and services that are consumed and produced in a community.

In Ontario the general system of resource allocation is a mixture of the free market-price system and direct government participation. Although government provision of general sanitation and public health facilities has a long history, the system of allocating resources within the health sector traditionally has been predominantly that of the market-price system. In recent times this predominance has been diminished, if not eliminated, by the entrance of government into large-scale financing of medical education and direct hospital care.

There are numerous systems that might solve the general problem of resource allocation.⁴ One broad set of alternatives involves the centralization of decision-making. "Which and how many health goods and services should be provided?", "How and by whom they should be produced?", and "Who should receive them?" are decisions that can be made by a number of individuals or groups of individuals, such as a dictator, religious hierarchy or government-appointed committee.⁵

Or, the economic problem can be solved by adopting a system that decentralizes the decision-making process. Such a solution could involve sole, or at least principal, use of the free market-price system.⁶ In Ontario we have adopted a mixture of centralized and decentralized decision-making.

The second aspect of the structural organization — the institutional framework of licensing procedures and regulations, and associated educational requirements — is a principal determinant of the quantity and quality of human health care resources in our society. For example, in Ontario there exist numbers of general practitioners, specialists, dentists, nurses, and so on, each of whom can be thought of as a kind of health care resource. As such they possess particular skills that can be used to provide specified health goods and services.

⁴Of course they vary in their ability to solve the basic problem.

⁵At best, these solutions are characterized by paternalism; in practice, by the pursuit of self-interest on the part of those making the decisions.

⁶Decisions as to the nature of distribution of income among individuals presumably could still be made by governments.

As the size⁷ of this framework grows and, thus, as less reliance is placed on the market-price system, this aspect becomes more important for allocating resources to and within the health sector. The framework of licensing procedures is, of course, the preserve of government. However, governments tend to allocate their responsibilities in this area to professional bodies and associations.

Long-standing patterns and practices which characterize the health sector constitute the third aspect of structural organization. Included under this heading are the widespread use of "fee-for-services" schedules; the traditional, but now declining, importance of charitable and religious bodies; the sometimes exceedingly powerful hospital committees that guide the provision of hospital care; and the widespread use of solo practice to organize the process of providing personal health services.

These traditional characteristics of the health sector are themselves influenced by both the institutional framework of licensing procedures and the general system of resource allocation. In addition, they are influenced by the progress of medical science and by the power of highly organized producer groups. As use of the market-price system diminishes, this third aspect also becomes more important to governments concerned with the provision of health care.

The evaluation of the economic structure of the health sector, and thus the evaluation of a particular solution to an economic problem, requires an examination of specialization and division of labour. For just as these factors were the basis for improvements in the level of living two centuries ago, so also are they today.⁸ This is true not only for the economy as a whole but also for each sector of it. In the health sector, improvements in the quantity and quality of health care are made possible by specialization. Nurses, physicians, dentists and pharmacists each have special skills for providing particular kinds of health care. An assessment of the structural organization of health care resources thus necessitates an appraisal of the division of labour among them.

Resource specialization is optimal for a given distribution of income if resources are allocated solely by the free market-price system and if the conditions of perfect competition prevail.⁹ The absence of these two conditions all but guarantees that resource specialization will not be optimal.¹⁰

⁷Size refers to the number and complexity of licensing procedures, regulations, educational requirements, and so on.

⁸For an elaboration of this point, see the quotation on p. 1.

⁹Strictly, the absence of externalities of consumption and product also must be postulated, in addition to the four conditions characterizing perfect competition — namely: a large number of buyers and sellers each of whom buy or sell only a small part of the product; completely homogeneous and infinitely durable products; factors of production that are infinitely mobile with zero transportation and installation costs; and perfect knowledge.

¹⁰An institutional framework of licensing procedures and direct government provision of health care are departures from exclusive use of the free market-price system.

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Societies are characterized by the existence of institutional frameworks of licensing procedures, regulations and associated educational requirements. In addition, their governments are participating to an increasing extent in the direct provision of health care. Resource specialization is thus not optimal and only by chance would it be close to optimal. It is therefore reasonable to examine the structural organization of health care resources to see if it might be improved. Such a review of the economic structure of the health sector seems all the more important when one considers the expected growth in demand for health care in relation to the expected growth in the supply of health care resources.

Although Canadian medical schools have been producing, relative to the population, approximately the same number of graduates since 1911,¹¹ and the physician:population ratio has improved since 1931,¹² physicians have become increasingly pressed for time as patient loads have increased. This is the result not only of increased demand but also to some extent of the growing number of graduates taking postgraduate education, whereby the length of a physician's effective working career is reduced.

Further, a large number of the physicians augmenting the supply of medical manpower in the 1950's were immigrant physicians;¹³ they represented up to 52.2 per cent of Canadian medical graduates.¹⁴ But medical immigration has been falling off at an increasing rate. The Royal Commission on Health Services expects the physician:population ratio to improve until 1971, but thereafter to deteriorate unless there is an expansion of educational facilities.¹⁵ Using the currently expected supply of physicians, with a net annual immigration of 50,000, we illustrate the seriousness of the projected shortage of physicians in Table 1.1.

Clearly, if the number of patient visits increases with the increases in demand (and this may be expected if a national health care plan is introduced), and/or if general immigration is greater than 50,000 (as is expected by the Economic Council of Canada), this shortage will be even more pronounced. It thus seems quite timely to evaluate the existing economic structure of the health sector with a view to determining whether alterations of it would give rise to a larger bundle of health care being provided from the given bundle of resources.

Several aspects of the nature and structural organization of health care resources are examined in this study. In particular, our attention is directed to the institutional framework of licensing procedures. Are there changes in this framework that would improve the efficiency with which health care is provided? (It

¹¹S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 10.

¹²*Ibid.*, p. 8.

¹³John Fry, "The General Practitioner and the Hospital", *Medical Care*, Vol. I, July-September, 1963, pp. 151-154.

¹⁴S. Judek, *op. cit.*, p. 42.

¹⁵*Ibid.*, p. 523.

TABLE 1.1

**Projected Five-Year Requirements and Expected Supply of Physicians,
Canada, 1961-1991**

Net Annual Immigration = 50,000

Year	Population estimate (thousands)	Expected supply of physicians	Constant physician: population ratio 1.85 ¹		Constant 5.3784 ² physician visits per capita	
			Total re-quirements for phys.	Surplus on deficit	Total re-quirements for phys.	Surplus on deficit
1961	18,238.2	21,290	21,290	—	21,290	—
1966	20,296.5	23,489	23,683	- 194	23,764	- 275
1971	22,589.5	25,826	26,358	- 532	26,448	- 622
1976	25,233.5	27,579	29,443	-1,864	29,545	-1,966
1981	28,246.7	29,069	32,959	-3,890	33,071	-4,002
1986	31,545.9	30,335	36,809	-6,474	36,935	-6,600
1991	35,106.7	31,410	40,964	-9,554	41,104	-9,694

¹The 1961 physician:population ratio is based on 1961 census data.

²On a per capita basis, each person in Canada in 1961 received 5.3784 physician visits; this includes consultation in person or by telephone in office, home or hospital.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, Table 8-2, p. 168.

should be emphasized that we do not aim to set forth a detailed list of such changes.)

In addition, we attempt to indicate the fundamental economic nature of the provision of health care. In turn, we argue that a satisfactory solution to this problem must involve consideration of the economic aspects of structural organization.

The three essential elements of the economic problem of providing health care in Ontario are examined individually in the following three chapters. We thus describe the inputs, outputs, and processes through which inputs are transformed into outputs in the health care sector. Specifically, in Chapter 2 we describe the existing supply of health care resources in the context of scarcity;¹⁶ in Chapter 3, we describe the kinds (quantity and quality) of health goods and services provided in Ontario in light of the many possible health goods that could be provided but are not; and in Chapter 4 we describe some of the alternative ways in which scarce health care resources are or could be combined to produce particular goods

¹⁶A more detailed inventory of the supply of health care resources is contained in Appendix I. Interprovincial and international comparisons of supply also are contained in this appendix. Information on the distribution of those resources is contained in Appendix II.

and services. In so describing health care resources, health goods and services, and the ways in which the former combine to produce the latter, we are in fact describing the nature of the solution to the problem of providing health care that results from the structure of Ontario's health care system. (This structure in practice involves the use of both the free market-price system and government participation, a particular institutional framework of licensing procedures, and a set of traditional patterns of providing health care.)

In Chapter 5 we describe the goals sought by the structural organization and set forth criteria by which this structure can be evaluated. The central position of specialization in a system of resource allocation is established. The place of public goods in the health sector is distinguished and thereby the need for an institutional framework of licensing procedures and for direct government activity in the health sector. In this chapter we also look briefly at some of the economic aspects associated with use of particular general systems of resource allocation.

The final part of the study contains an analysis of selected economic aspects of the existing economic structure of the health sector. In Chapter 6 we examine the traditional form of the practice of medicine — namely, solo practice; and we ask whether group practice offers sufficient advantage to warrant the encouragement of its use by physicians.

In Chapters 7 and 8 we examine the effectiveness of another aspect of the economic structure of the health sector — that of the institutional framework of licensing procedures. In the first of these chapters we evaluate the use of dental health nurses for the provision of dental care to children under eighteen years of age who suffer from dental caries. In the second, we evaluate the use of a combination of midwives and obstetricians for the provision of prenatal, delivery and confinement, and postnatal care.

Finally, we examine in Chapter 9 the possibility of expanding the role of the public health nurse to one which would permit her to provide a wider range of health care services than is now possible. Such a change probably would involve not only a change in traditional practice but also a change in the institutional framework of licensing procedures; a new education program undoubtedly would be required to train such personnel for proposed job functions.

Our conclusions are set out in Chapter 10. In addition to summarizing our conclusions of Chapters 6, 7, 8 and 9, we discuss briefly the question of the acceptance of the proposed new forms of health care personnel and the question of the training of females for positions in the health sector. We also look briefly at the implications of the proposed national medical care plan.

Chapter 2 Health Care Resources

In this chapter we concentrate our attention on the foremost element of the economic problem of providing health care; namely, the scarcity of human and non-human health care resources. Following a discussion of the economic concept of scarcity, we present data on the proportion of Ontario's manpower resources that is allocated to the health sector. Next we present a more detailed inventory of health care resources in Ontario in 1966, attempting to cover both human and non-human resources. Then we outline the geographical distribution of these resources.

We might emphasize that the quantity, quality and distribution of health care resources in Ontario are the outcome of the particular structure of the health sector, where again structure is defined as the combination of the general system of allocating resources (in Ontario, a mixture of the free market-price system and government activity), the institutional framework of licensing procedures, and traditional patterns of providing health care. Therefore our inventory of health care resources should fulfil two goals: first, it should draw attention to the real limitations of the supply of health care resources in Ontario; second, it should describe the nature of the particular bundle of health care resources in Ontario which derives from the existing structure of the health sector.

After an examination of the changing composition of health care resources through time, finally we compare the level of health care resources in Ontario to that found in other countries. These international comparisons, and the provincial and time comparisons drawn throughout this chapter are particularly helpful in discerning the effects of different solutions to the economic problem of providing health care (that is, the effects of different structures of the health sector) on the nature of the existing bundle of health care resources.

Conceptual Scarcity

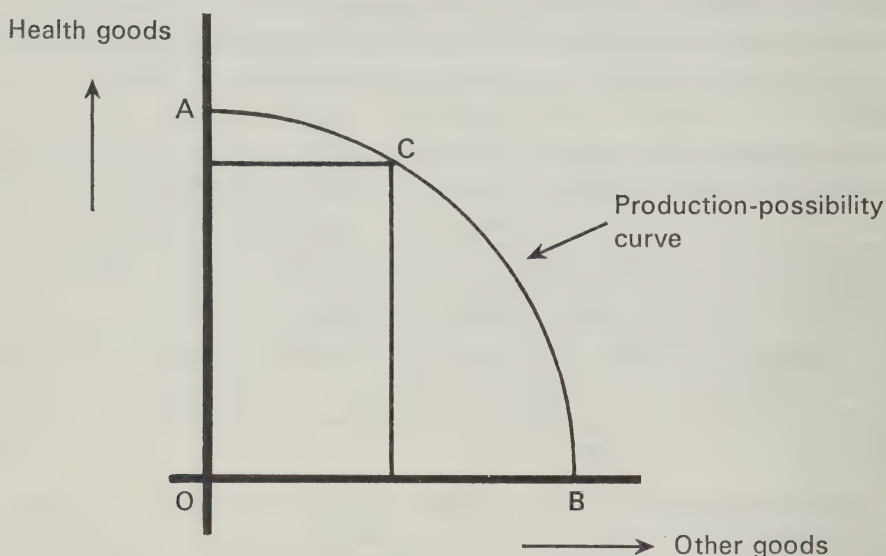
Scarcity of resources is a problem that confronts every economy. This scarcity derives from the assumed nature of human beings: their wants are insatiable. At any level of consumption, they want more goods and services than existing resources are capable of producing.

In the case of almost every good or service, people are willing to pay some

price for the right to consume it;¹ that is, they are willing to forego something of value in order to acquire the particular goods. From this observation of prices being paid, we conclude that resources are not abundant enough to produce at a zero price all the goods and services that people would want.

Scarcity of resources thus determines the production possibilities of which our society is capable. Society could devote *all* of its productive capacity to producing health goods and services. If it did, there would be some maximum level of production that could be reached. Alternatively, society could devote *no* productive capacity to the production of health care and could attain some other limiting point. As a society moves away from one of these limiting points, it must give up

Figure 2.1. Production-possibility curve of the economy



Point A represents the situation in which all of society's resources are devoted to the production of health goods and the point B, that in which only other goods are produced. (The attainment of either of these positions assumes the full utilization of the technical knowledge available to society and also assumes full employment.) Points on the production-possibility curve between A and B represent combinations of health goods and other goods that society could produce. But note that, as society moves from point B to point C, it must give up some part of its production of "other goods" in order to produce health goods. The production possibility curve, then, shows the different combinations of health goods and other goods that could be produced by the resources available in an economy at any point in time.

¹Certain goods are not scarce. Air and water are not generally scarce; thus they are called *free* goods, as opposed to *economic* goods. In light of current investigations into levels of air and water pollution, it would seem that both these goods, or rather clean air and clean water, are becoming economic goods.

some part of its production of the one set of goods in order to free resources for the production of the other set of goods.

Note that our basic premise — that human wants are insatiable — means that society would not regard as sufficient the amount of health goods and services that could be produced even if all its resources were devoted to the provision of health care. We say, then, that the resources needed to produce these goods are scarce. This concept of scarcity can be easily illustrated with the help of the production-possibility curve drawn in Figure 2.1.

TABLE 2.1
Percentage of Labour Force Employed in Health Services Industries,
Canada and the Provinces, 1941, 1951 and 1961

Province	1941	1951	1961
Canada ¹	2.1417	2.9592	4.3518
Newfoundland	—	2.4227	3.9792
Prince Edward Island	1.8617	2.8664	4.4014
Nova Scotia	2.1844	2.9095	4.6318
New Brunswick	2.0732	3.1239	5.0243
Quebec	1.8399	2.4819	3.7721
Ontario	2.3882	2.9703	4.4050
Manitoba	2.2314	3.1083	4.5584
Saskatchewan	1.6637	3.4518	4.9646
Alberta	1.9143	2.9616	4.4114
British Columbia	2.7843	4.1523	5.1353

¹Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

SOURCE: DBS, *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 12.

Relative Size of the Canadian Health Sector

Perhaps a more meaningful way to draw attention to the concept of scarcity is to indicate the actual level of resources in the health sector in relation to the level of resources in the whole province. In Table 2.1, we present information on the percentage of the total labour force that is employed in the health service industries. In Ontario, this number has increased from 2.4 per cent in 1941 to 4.4 per cent in 1961. Note that in 1961, in only three provinces is a smaller percentage of the total labour force employed in the health services industries than in Ontario, but that the percentage in Ontario is greater than the overall Canadian average. The closeness of these percentages suggests that conditions of supply and demand in the health sector in relation to the total economy are roughly similar in all Canadian provinces.²

²If the capital output ratio in the economy as a whole is similar to that found in the health sector, we would expect the total value of health goods and services produced in Canada to be about 4 or 5 per cent of total output in 1961. Because the human capital embodied in the health sector labour force is higher on average than that embodied in the total labour force, we would expect this percentage to be somewhat higher.

TABLE 2.2
Health Professionals as a Percentage of the Labour Force, Fifteen Years of Age and Over, Canada and the Provinces, 1961

Profession	Canada ¹	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Health professionals	2.1384	1.7211	2.1114	2.3832	2.1070	1.8541	2.1989	2.1565	2.4319	2.1531	2.5616
Physicians and surgeons	0.3293	0.2048	0.2665	0.2981	0.2551	0.3488	0.3360	0.3269	0.2921	0.2770	0.3722
Dentists	0.0846	0.0374	0.0732	0.0722	0.0606	0.0737	0.0961	0.0732	0.0611	0.0874	0.1103
Nurses, graduate	0.9531	0.6972	0.9459	1.1174	1.1152	0.7093	1.0271	0.8828	1.1155	1.0018	1.2343
Nurses in training	0.3560	0.5048	0.5154	0.5185	0.3398	0.3646	0.3171	0.3774	0.4779	0.3236	0.3374
(All nurses)	1.3091	1.2020	1.4613	1.6362	1.4550	1.0739	1.3442	1.2602	1.5934	1.3254	1.5717
Osteopaths, chiropractors	0.0172	0.0009	0.0059	0.0080	0.0090	0.0136	0.0207	0.0128	0.0110	0.0255	0.0232
Med. and dent. technicians	0.2124	0.1736	0.1493	0.2255	0.1973	0.1950	0.2042	0.2772	0.2737	0.2216	0.2296
Phys. and occ. therapists	0.0414	0.0276	0.0381	0.0253	0.0280	0.0269	0.0471	0.0444	0.0405	0.0515	0.0660
Optometrists	0.0185	0.0036	0.0088	0.0165	0.0179	0.0196	0.0173	0.0158	0.0218	0.0206	0.0227
Pharmacists	0.1150	0.0668	0.0937	0.0861	0.0734	0.0912	0.1246	0.1363	0.1296	0.1324	0.1470
Other health professionals	0.0109	0.0044	0.0146	0.0152	0.0106	0.0172	0.0088	0.0096	0.0086	0.0116	0.0190

¹Excludes Yukon and Northwest Territories.

SOURCE: DBS, *Census of Canada, 1961*, Vol. III, Part 1, Queen's Printer, Ottawa, 1963, Table 6; and *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966.

More detailed data on the relative size of the health sector are presented in Tables 2.2 and 2.3. Table 2.2 indicates the number of health professionals in total and in eleven different occupational subgroups as a percentage of the labour force, fifteen years of age and over, in 1961; and Table 2.3 gives similar information for all health professionals and seven subgroups for the years 1941, 1951 and 1961. In almost every case, the percentage of the labour force employed in a health occupational group in Ontario is close to, and slightly higher than, the corresponding figure for Canada as a whole.

TABLE 2.3
Health Professionals as a Percentage of the Labour Force, Fifteen Years of Age and Over, Canada and the Provinces, 1941, 1951 and 1961

Province	Year	Health pros.	Phys. and surgs.	Dents.	Nurses, grad.	Nurses in training	(All nurses)	Osteos. and chiros.	Med. and dent. techs.
Canada ¹	1941	1.5432	0.2563	0.0894	0.6364	0.2840	0.9204	0.0136	—
	1951	1.6258	0.2715	0.0873	0.6659	0.2961	0.9620	0.0158	0.1062
	1961	2.1384	0.3293	0.0846	0.9531	0.3560	1.3091	0.0172	0.2124
Newfoundland	1941	—	—	—	—	—	—	—	—
	1951	0.9585	0.1344	0.0169	0.3862	0.2716	0.6578	0.0009	0.0789
	1961	1.7211	0.2048	0.0374	0.6972	0.5048	1.2020	0.0009	0.1736
Prince Edward Island	1941	1.4244	0.2154	0.0707	0.6527	0.3087	0.9614	0.0032	—
	1951	1.6241	0.2144	0.0822	0.6285	0.4405	1.0690	0.0059	0.1116
	1961	2.1114	0.2665	0.0732	0.9459	0.5154	1.4613	0.0059	0.1493
Nova Scotia	1941	1.5845	0.2245	0.0766	0.6965	0.3965	1.0930	0.0063	—
	1951	1.6787	0.2666	0.0811	0.7036	0.3758	1.0794	0.0082	0.0975
	1961	2.3832	0.2981	0.0722	1.1177	0.5185	1.6362	0.0080	0.2255
New Brunswick	1941	1.4978	0.1847	0.0691	0.6582	0.3852	1.0434	0.0082	—
	1951	1.6982	0.2115	0.0658	0.6874	0.4806	1.1680	0.0118	0.1055
	1961	2.1070	0.2551	0.0606	1.1152	0.3398	1.4550	0.0090	0.1973
Quebec	1941	1.2082	0.2676	0.0734	0.5152	0.1671	0.6823	0.0041	—
	1951	1.3011	0.2792	0.0703	0.4999	0.2337	0.7336	0.0068	0.0880
	1961	1.8541	0.3488	0.0737	0.7093	0.3646	1.0739	0.0136	0.1950
Ontario	1941	1.8359	0.2890	0.1159	0.7580	0.3181	1.0761	0.0202	—
	1951	1.7178	0.2849	0.1044	0.7274	0.2678	0.9952	0.0227	0.0983
	1961	2.1989	0.3360	0.0961	1.0271	0.3171	1.3442	0.0207	0.2042
Manitoba	1941	1.5962	0.2487	0.0793	0.5529	0.4152	0.9681	0.0192	—
	1951	1.5981	0.2812	0.0829	0.5670	0.3010	0.8680	0.0138	0.1449
	1961	2.1565	0.3269	0.0732	0.8828	0.3774	1.2602	0.0128	0.2772
Saskatchewan	1941	1.1074	0.1670	0.0596	0.3946	0.2542	0.6488	0.0127	—
	1951	1.7355	0.2158	0.0713	0.7211	0.3773	1.0984	0.0146	0.1369
	1961	2.4319	0.2921	0.0611	1.1155	0.4779	1.5934	0.0110	0.2737
Alberta	1941	1.4033	0.2095	0.0698	0.5465	0.3172	0.8637	0.0160	—
	1951	1.6580	0.2376	0.0860	0.6424	0.3550	0.9974	0.0206	0.1148
	1961	2.1531	0.2770	0.0874	1.0018	0.3236	1.3254	0.0255	0.2216
British Columbia	1941	1.9800	0.2582	0.1023	0.8783	0.3379	1.2162	0.0204	—
	1951	2.3343	0.3098	0.1144	1.0447	0.4017	1.4464	0.0239	0.1568
	1961	2.5616	0.3722	0.1103	1.2343	0.3374	1.5717	0.0232	0.2296

¹Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

SOURCE: DBS, *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 8.

TABLE 2.4**Health Professionals as a Percentage of Professional and Technical Occupations,
Canada and the Provinces, 1941, 1951 and 1961**

Province	Year	Health professionals	Physicians and Surgeons	Dentists	Nurses, graduate
Canada ¹	1941	22.39	3.72	1.30	9.23
	1951	22.30	3.72	1.20	9.13
	1961	22.00	3.39	0.87	9.81
Newfoundland	1941	—	—	—	—
	1951	18.48	2.59	0.33	7.44
	1961	20.40	2.43	0.44	8.26
Prince Edward Island	1941	25.13	3.80	1.25	11.51
	1951	27.89	3.68	1.41	10.79
	1961	27.76	3.50	0.96	12.44
Nova Scotia	1941	27.23	3.86	1.32	11.97
	1951	25.90	4.11	1.25	10.85
	1961	26.44	3.31	0.80	12.40
New Brunswick	1941	26.39	3.25	1.22	11.60
	1951	26.25	3.27	1.02	10.62
	1961	22.86	2.77	0.66	12.10
Quebec	1941	15.31	3.39	0.93	6.53
	1951	16.65	3.57	0.90	6.40
	1961	18.24	3.43	0.72	6.98
Ontario	1941	26.06	4.10	1.64	10.76
	1951	22.87	3.79	1.39	9.68
	1961	22.14	3.38	0.97	10.34
Manitoba	1941	25.49	3.97	1.26	8.83
	1951	25.02	4.40	1.30	8.88
	1961	25.19	3.82	0.86	10.31
Saskatchewan	1941	21.23	3.20	1.14	7.56
	1951	27.34	3.40	1.12	11.36
	1961	28.42	3.41	0.71	13.04
Alberta	1941	24.42	3.64	1.22	9.51
	1951	24.55	3.52	1.27	9.51
	1961	22.63	2.91	0.92	10.53
British Columbia	1941	28.01	3.65	1.45	12.42
	1951	30.56	4.06	1.50	13.67
	1961	26.11	3.79	1.12	12.58

¹Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

SOURCE: DBS, *Census of Canada, 1961*, Vol. III, Part 1, Queen's Printer, Ottawa, 1963, Table 6; and *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 8.

Nurses in training	(All nurses)	Osteopaths and chiroprac- tors	Medical and dental technicians	Physio and occupa- tional therapists	Optometrists	Pharma- cists	Other health profes- sionals
4.12	13.35	0.20	—				
4.06	13.19	0.22	1.46				
3.66	13.47	0.18	2.19	0.43	0.19	1.18	0.11
—	—	—	—				
5.23	12.67	0.02	1.52				
5.98	14.24	0.01	2.06	0.33	0.04	0.79	0.05
5.44	16.95	0.05	—				
7.56	18.35	0.10	1.91				
6.78	19.22	0.08	1.96	0.50	0.12	1.23	0.19
6.81	18.78	0.11	—				
5.80	16.65	0.12	1.50				
5.75	18.15	0.09	2.50	0.28	0.18	0.96	0.17
6.79	18.39	0.14	—				
7.43	18.05	0.18	1.63				
3.69	15.79	0.10	2.14	0.30	0.19	0.80	0.12
2.12	8.65	0.05	—				
2.99	9.39	0.09	1.12				
3.59	10.54	0.13	1.91	0.26	0.19	0.90	0.17
4.52	15.28	0.29	—				
3.56	13.24	0.30	1.31				
3.19	13.53	0.21	2.06	0.47	0.17	1.25	0.09
6.63	15.46	0.31	—				
4.71	13.59	0.21	2.27				
4.41	14.72	0.15	3.24	0.52	0.18	1.59	0.11
4.87	12.43	0.24	—				
5.94	17.30	0.23	2.16				
5.58	18.62	0.13	3.20	0.47	0.25	1.51	0.10
5.52	15.03	0.28	—				
5.26	14.77	0.30	1.70				
3.40	13.93	0.27	2.33	0.54	0.21	1.39	0.12
4.78	17.20	0.29	—				
5.26	18.93	0.31	2.05				
3.44	16.02	0.24	2.34	0.67	0.23	1.50	0.19

The slowly increasing size of the health sector, as seen from the data in Table 2.3, presumably reflects the effect of higher levels of income and education in society generally and the consequent higher valuation of health care. It may reflect also increased government activity in the provision of health care.

Although the size of health occupations has increased relative to the whole economy, it has not done so in relation to other professional occupations. The data presented in Table 2.4 show that health professions in Ontario as a percentage of all professional and technical occupations have declined from 26.06 per cent in 1941 to 22.14 per cent in 1961. This overall drop is found also in Canada as a whole and in five other provinces. Over the period 1941 to 1961,

TABLE 2.5

Total Current Expenditure on Health Services (Including Services Paid for by Recipients) as Percentage of Gross National Product and National Income

Year	(millions)	Country	Total Current Health Expenditure	Total Health Expenditure as % of Gross National Product	Total Health Expenditure as % of National Income	National Income per head, 1961 (U.S. \$)
Israel	1961/62	I£	320	5.9	7.4	1,042
Chile	1961	Esc	304	5.6	6.8	541
Canada	1961	C\$	2,045	5.5	7.3	1,475
U.S.A.	1961/62	US\$	29,859 ¹	5.5	6.8	2,306
Australia	1960/61	A£	346	4.9	6.0	1,236
Sweden	1962	Kr	3,683	4.9	5.6 ²	1,420 ²
Netherlands	1963	G	2,344 ¹	4.5	5.5	885
Yugoslavia	1961	Din	169,823	4.4	5.2	233
Finland	1961	F. Mk	691	4.3	5.4	891
France	1963	Fr	16,374 ¹	4.2	5.5	1,079
Federation of Rhodesia and Nyasaland	1960/61	£	21.3	4.1	4.6	130
United Kingdom	1961/62	£	1,088	4.0	4.9	1,172
Ceylon	1957/58	Rp	214	3.7	4.2	120
Kenya	1961/62	£	8.5	3.6 ³	—	72 ²
Poland		Zl	17,157	3.6 ²	4.0 ²	—
Czechoslovakia	1961	Cr	7,264	3.5 ²	4.0 ²	920 ²
Tanganyika	1961/62	£	5.36	2.5	2.8	54

¹Including depreciation.

²Estimated from a related aggregate.

³Gross domestic product at factor cost.

SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers, No. 32, World Health Organization, Geneva, 1967, p. 41.

dentists experienced the most notable drop of any occupational subgroup in Ontario (from 1.64 per cent in 1941 to .97 per cent in 1961), followed by physicians and surgeons (from 4.10 per cent to 3.38 per cent). These data may well indicate the relative magnitude of the barriers to entry in the different health occupational groups.

Finally, we draw attention to the data in Table 2.5, which indicate the relative sizes of the health sector in different countries. With 5.5 per cent of GNP arising in the health sector, Canada shares third ranking with the U.S.A.

The inclusion of capital expenditures alters the ranking of countries found in Table 2.5; this is shown by the data on total expenditure presented in Table 2.6.

TABLE 2.6
Total Expenditure on Health Services (Capital and Current) as Percentage of Gross National Product

Country	Year	Total Health Expenditures (millions)	Total Health Expenditure as % of GNP
Israel	1961/62	I£ 342	6.3
Canada	1961	US\$ 2,229	6.0
United States	1961/62	\$ 3,126 ¹	5.8
Chile	1961	Esc 307	5.6
Sweden	1962	S.Kr. 4,056	5.4
Australia	1960/61	A£ 370	5.2
Yugoslavia	1961	Din 192,699	5.0
Finland	1961	F. Mk 765	4.8
Netherlands	1963	G 2,514 ¹	4.8
France		F.Fr. 17,093 ¹	4.4
United Kingdom	1961/62	£ 1,145	4.2
Federation of Rhodesia and Nyasaland	1960/61	£ 22.0	4.2
Ceylon	1957/58	Rp 226	4.0
Poland	1961	Zl 18,224	3.7 ²
Czechoslovakia	1961	Kcs 7,764	3.6 ²
Kenya	1961/62	£ 8.88	3.5 ³
Tanganyika	1961/62	£ 5.86	2.5
<i>Incomplete coverage</i>			
Pakistan	1961/62	Rp 587	1.5

¹Including depreciation.

²Estimated from a related aggregate

³Gross domestic product at factor cost.

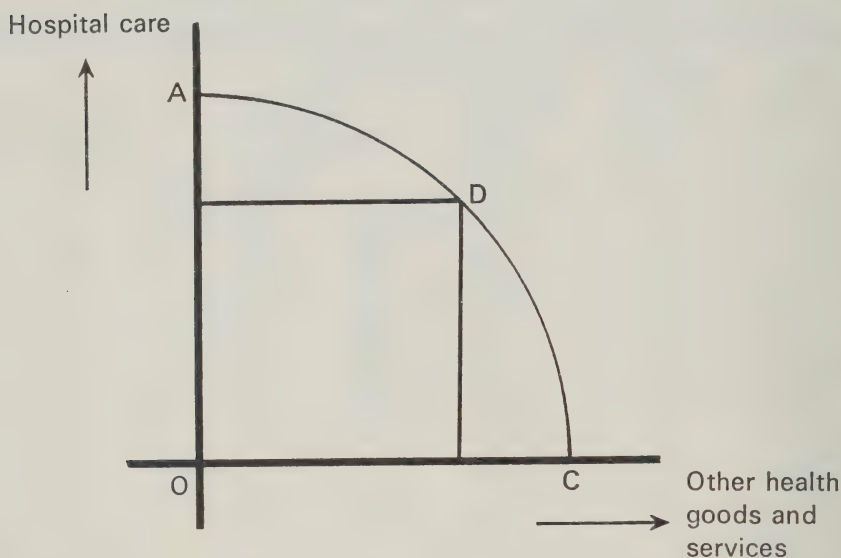
SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers, No. 32, World Health Organization, Geneva, 1967, p. 73.

Allocation of Resources

The importance of scarcity is heightened within the health sector itself. The given levels of health resources (physicians, laboratory technicians, hospital beds, and so on) are not sufficient to provide all the health care that everyone would want if there were no prices attached to various goods and services. Again, we can illustrate this scarcity by looking at the production-possibility curve in Figure 2.2.

We must *choose* some combination of health goods and services. The very fact that this choice must be made implies that resources are scarce. A description of the particular bundle of resources found in Ontario follows.

Figure 2.2. Production-possibility curve for the health sector



Assume that, by allocating all the resources of the health sector to the provision of hospital care, we acquire an amount OA . As above, society would not deem even this amount of hospital care sufficient to satisfy all its desires for such care. The moment we move along the production-possibility curve towards C , we have even less hospital care.

Human Resources³

The level of the health resources in Ontario is further revealed if we consider the absolute size of various health occupations and the size of these occupations in relation to the total population. For example, in 1966 there were 8,739 physicians

³Detailed inventories of the various human and non-human health care resources found in Ontario are presented in Appendix I.

and surgeons resident in Ontario and licensed by the College of Physicians and Surgeons of Ontario; this number represents 13.44 physicians for each 10,000 persons. Similar information for the other health professions is given in Table 2.7.

As the relative level of manpower is perhaps the more significant number, in Table 2.8 we have presented data on the number of health professionals and various occupational subgroups per 10,000 persons for all the Canadian provinces

TABLE 2.7
Number of Various Health Professions and Numbers per 10,000 Population in Ontario, 1966

Profession	Number in Ontario	Number per 10,000 Population
Physicians	8,739	13.44
Registered nurses	35,430	54.49
Dietitians	1,560	2.24
Professional social workers	1,100	1.58
Chiropractors	605 ¹	0.86
Osteopaths	67 ¹	0.096
Naturopaths	150 ¹	0.21
Pharmacists	4,153	5.96
Dentists	2,505	3.59
Occupational therapists	266 ¹	0.38
Physiotherapists	831	1.19
Registered masseurs	392 ¹	0.56
Full speech therapists	52	0.074
Psychiatrists	350	0.50
Psychologists	510	0.73
Radiological technicians	1,861	2.67
Laboratory technologists	1,466	2.10
Dental specialists	153	0.21
Dental hygienists	189	0.27
Dental assistants	2,350	3.37
Spiritual healers	25 ¹	0.035
Hypnotists	5	0.0071
Chiropodists	71	0.101
Rheumatologists	20	0.028
Optometrists	533 ¹	0.76
Medical refractionists	376	0.54
Ophthalmic dispensers	282	0.40
Ophthalmologists	250	0.35

¹Data are for 1965.

SOURCE: See Appendix I.

for the census years 1941, 1951 and 1961. In 1961, with 84.38 health professionals per 10,000 persons, Ontario occupied third rank in Canada behind British Columbia (90.83) and Saskatchewan (85.58).

TABLE 2.8
Health Professionals per 10,000 Persons, Canada and the Provinces,
1941, 1951 and 1961

Province	Year	Health pros.	Phys. and surgs.	Dents.	Nurses, grad.	Nurses in training	Osteos. and chiros.	Med. and dent. techns.
Canada	1941	56.19	9.33	3.26	23.17	10.34	0.49	—
	1951	61.35	10.24	3.30	25.13	11.17	0.59	4.00
	1961	75.72	11.66	3.00	33.75	12.61	0.61	7.52
Newfoundland	1941	—	—	—	—	—	—	—
	1951	28.22	3.96	0.50	11.37	8.00	0.03	2.33
	1961	42.21	5.02	0.91	17.10	12.38	0.02	4.26
Prince Edward Island	1941	46.63	7.05	2.32	21.37	10.11	0.11	—
	1951	56.20	7.42	2.84	21.75	15.24	0.20	3.88
	1961	68.93	8.70	2.39	30.87	16.83	0.19	4.86
Nova Scotia	1941	52.27	7.40	2.53	22.98	13.08	0.21	—
	1951	57.63	9.15	2.79	24.15	12.90	0.28	3.34
	1961	76.58	9.58	2.32	35.92	16.66	0.25	7.25
New Brunswick	1941	47.86	5.90	2.21	21.03	12.31	0.26	—
	1951	55.57	6.92	2.15	22.49	15.73	0.38	3.45
	1961	62.85	7.61	1.81	33.27	10.14	0.27	5.88
Quebec	1941	42.85	9.49	2.61	18.27	5.92	0.14	—
	1951	47.07	10.11	2.55	18.09	8.45	0.24	3.18
	1961	62.33	11.73	2.48	23.85	12.26	0.46	6.56
Ontario	1941	70.38	11.08	4.44	29.06	12.19	0.77	—
	1951	70.33	11.66	4.28	29.78	10.97	0.93	4.02
	1961	84.38	12.89	3.69	39.41	12.17	0.79	7.84
Manitoba	1941	57.96	9.03	2.87	20.08	15.07	0.70	—
	1951	61.34	10.79	3.18	21.76	11.55	0.53	5.57
	1961	80.17	12.15	2.72	32.82	14.03	0.48	10.31
Saskatchewan	1941	38.99	5.88	2.10	13.89	8.95	0.45	—
	1951	62.94	7.83	2.58	26.15	13.68	0.53	4.96
	1961	85.58	10.28	2.15	39.26	16.82	0.39	9.63
Alberta	1941	50.73	7.57	2.52	19.76	11.47	0.58	—
	1951	62.38	8.94	3.24	24.17	13.36	0.78	4.32
	1961	79.13	10.18	3.21	36.82	11.89	0.93	8.15
British Columbia	1941	75.95	9.90	3.93	33.69	12.96	0.78	—
	1951	88.92	11.80	4.36	39.80	15.30	0.90	5.97
	1961	90.83	13.20	3.91	43.77	11.96	0.82	8.14

SOURCE: DBS, *Census of Canada, 1941, 1951 and 1961*.

Non-Human Resources

Although data on non-human health care resources are not as readily available as those presented above on human health care resources, we can still give a reasonably good indication of the nature of the bundle of non-human resources.⁴ For example, in Ontario in 1966 there were 326 hospitals with 69,220 hospital beds. Further information on the non-human health resources in Ontario in 1966 is presented in Table 2.9.

TABLE 2.9
Number of Various Health Care Institutions in Ontario, 1966

Institution	Number
Hospitals	326
Hospital beds	69,220
Pharmacies	1,874
Speech and hearing clinics and hospitals	26
Speech and hearing rehabilitation centres	7
Speech and hearing educational services	27
Crippled children's centres	7
Audiological evaluation and treatment centres	14
Medical clinics	14

SOURCE: See Appendix I.

Table 2.10 presents more detailed information on the absolute number of hospitals and their bed capacities by type of hospital in 1964. Data are given also for Canada as a whole and for the other provinces.

From the data in Table 2.11, on the percentage distribution of hospitals and their bed capacities by type of hospital for Canada and for each of the provinces in 1964, we can compare the composition of the hospital sector in Ontario with that found in other provinces. The number of beds in mental hospitals as a percentage of all beds is similar for all provinces — approximately 32 per cent. By contrast the number of beds in tuberculosis hospitals as a percentage of all beds varies among provinces.

Perhaps more significant in indicating the relative level of hospital resources are data on rated bed capacity per 1,000 persons. This information is presented

⁴In 1965 the gross and net stock of fixed capital at mid-year in the hospital sector in current dollars, were 3.561 and 2.585 billion dollars, respectively. These figures compare with 21.342 and 13.216 billion dollars for the gross and net mid-year stock of capital in all manufacturing industries in Canada in 1960 (in 1960, the gross and net stock of fixed capital in the hospital sector were 2.337 and 1.699 billion dollars, respectively).

The sources of these statistics are unpublished data supplied by M. Pelletier, Chief, Capital Stock Section, Business Finance Division, Dominion Bureau of Statistics; and the publication, *Fixed Capital Flows and Stocks, Manufacturing, Canada 1926-1960*, Catalogue No. 13,522, Queen's Printer, Ottawa, 1967, Table 1, page A-2.

TABLE 2.10
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital,
Canada² and the Provinces, 1964

Province	All hospitals			General and allied special						Mental		T.B.	
	No.	Cap.	Total	General		Allied Sp.		No.	Cap.	No.	Cap.	No.	Cap.
				No.	Cap.	No.	Cap.						
Canada	1,414	203,222	1,269	131,324	942	110,522	327	20,802	100	65,548	45	6,350	
Newfoundland	48	3,683	46	2,579	33	2,425	13	154	1	826	1	278	
Prince Edward Island	12	1,210	9	722	8	692	1	30	2	398	1	90	
Nova Scotia	63	8,202	51	4,857	48	4,672	3	185	10	2,993	2	352	
New Brunswick	45	6,142	39	3,997	35	3,800	4	197	2	1,584	4	561	
Quebec	308	55,724	266	35,158	163	26,994	103	8,164	28	18,874	14	1,692	
Ontario	364	69,812	317	46,050	200	38,691	117	7,359	34	22,143	13	1,619	
Manitoba	109	10,703	102	6,771	87	5,712	15	1,059	4	3,472	3	460	
Saskatchewan	161	11,295	155	7,454	147	6,866	8	588	4	3,529	2	312	
Alberta	150	17,762	141	11,700	111	9,244	30	2,456	7	5,495	2	567	
British Columbia	123	18,047	112	11,394	96	10,862	16	532	8	6,234	3	419	

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1964, Table 4.

TABLE 2.11
Percentage Distribution of Reporting Hospitals and their Bed Capacities,¹
by Type of Hospital, Canada² and the Provinces, 1964

Province	All Hospitals Hosps.	Beds	General Hosps.	Beds	Allied Special Hosps.	Beds	Mental Hosps.	Beds	Tuberculosis Hosps.	Beds
Canada	100.0	100.0	66.7	54.5	23.2	10.3	6.9	32.1	3.1	3.1
Newfoundland	100.0	100.0	68.7	65.8	27.1	4.2	2.1	22.4	2.1	7.5
Prince Edward Island	100.0	100.0	66.7	57.2	8.3	2.5	16.7	32.9	8.3	7.4
Nova Scotia	100.0	100.0	75.8	56.9	4.8	2.3	16.1	36.5	3.2	4.3
New Brunswick	100.0	100.0	77.8	61.9	8.9	3.2	4.4	25.8	8.9	9.1
Quebec	100.0	100.0	53.4	48.5	33.8	14.7	8.5	33.8	4.3	3.0
Ontario	100.0	100.0	54.9	55.4	32.1	10.5	9.3	31.7	3.6	2.3
Manitoba	100.0	100.0	79.8	53.4	13.8	9.9	3.7	32.4	2.7	4.3
Saskatchewan	100.0	100.0	91.3	60.8	5.0	5.2	2.5	31.2	1.2	2.8
Alberta	100.0	100.0	74.5	53.6	20.1	14.2	4.0	28.9	1.3	3.3
British Columbia	100.0	100.0	78.0	60.2	13.0	2.9	6.5	34.5	2.4	2.3

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1964, Table 5.

in Table 2.12, for the years 1954 to 1964, for all provinces and for Canada. In Ontario and in most of the other provinces there exists an upward trend in the number of beds per 1,000 persons.

As the hospital sector is almost entirely within the government sector and has been for some time, changes in its relative size reflect changes in the attitude of government to the need for hospital care relative to other goods and services — in particular, relative to such other goods provided by the government as university education, expressways, and so on.

TABLE 2.12
Rated Bed Capacity per 1,000 Persons, Reporting Public General and Allied Special Hospitals, Canada and the Provinces, 1954-1964

Year	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1954	4.94	4.57	6.30	4.85	4.12	4.04	4.94	5.55	5.93	6.19	5.94
1955	5.24	4.32	6.29	5.20	4.34	4.67	5.14	5.69	6.44	6.30	5.86
1956	5.35	4.32	6.75	4.86	4.41	4.78	5.36	5.94	6.63	6.33	5.73
1957	5.31	4.01	6.64	4.74	4.38	5.08	5.21	5.35	6.80	6.33	5.27
1958	5.46	4.03	6.59	4.65	4.65	5.55	5.13	5.50	7.40	6.28	5.32
1959	5.58	4.44	6.83	4.66	5.06	5.70	5.28	5.51	7.06	6.59	5.35
1960	5.40	3.70	7.15	4.63	5.14	5.00	5.39	5.69	7.34	6.44	5.48
1961	5.51	3.78	6.83	4.94	5.20	5.02	5.53	5.96	7.41	6.59	5.60
1962	5.68	3.97	6.83	5.18	5.55	5.22	5.68	6.19	7.43	6.84	5.55
1963	5.88	4.64	6.70	5.18	5.65	5.41	5.92	6.20	7.58	7.02	5.56
1964	5.96	5.18	6.75	5.32	5.83	5.41	6.06	6.12	7.74	7.48	5.47

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1964, Table 13.

Finally, mention should be made of the large block of health care resources that comprise the institutions for educating the various types of health care personnel.⁵

Composition

The nature of the given bundle of human health care resources can be described also by a calculation of the percentage of total health manpower involved in a given health occupation. Accordingly, in Table 2.13 we present data on the number of health professionals in twelve categories of health occupations as percentages of the total number of health professionals.

It is possible also to compare the composition of professional health manpower found in Ontario with that found in other provinces. For example, osteopaths and chiropractors account for .94 per cent of all health professionals in Ontario, for as low as .05 per cent in Newfoundland, and for as high as 1.19 per cent of all health professionals in Alberta.

⁵See various studies done for the Royal Commission on Health Services, 1964, in particular J. A. MacFarlane, *Medical Education in Canada*, Queen's Printer, Ottawa, 1965, Chapter 2 and Table 2-1, p. 16.

TABLE 2.13
Percentage Composition of Health Professionals, Canada and the Provinces, 1961

Profession	Canada ¹	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Health professionals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Physicians and surgeons	15.40	11.90	12.62	12.51	12.11	18.81	15.28	15.16	12.01	12.86	14.53
Dentists	3.96	2.17	3.47	3.03	2.87	3.97	4.37	3.40	2.51	4.06	4.30
Nurses, graduate	44.57	40.51	44.80	46.90	52.93	38.26	46.71	40.94	45.87	46.53	48.19
Nurses in training	16.65	29.33	24.41	21.76	16.13	19.66	14.42	17.50	19.65	15.03	13.17
(All nurses)	61.22	69.84	69.21	68.66	69.06	57.92	61.13	58.44	65.52	61.56	61.36
Osteopaths and chiropractors	0.80	0.05	0.28	0.34	0.42	0.73	0.94	0.59	0.45	1.19	0.90
Medical and dental technicians	9.96	10.09	7.07	9.46	9.37	10.51	9.29	12.86	11.25	10.29	8.96
Physical and occupational therapists	1.94	1.60	1.80	1.06	1.33	1.45	2.14	2.06	1.67	2.39	2.57
Optometrists	0.86	0.21	0.42	0.69	0.85	1.06	0.79	0.73	0.90	0.96	0.89
Pharmacists	5.38	3.88	4.44	3.61	3.49	4.92	5.66	6.32	5.33	6.15	5.74
Other health professionals	0.51	0.26	0.69	0.64	0.50	0.93	0.40	0.45	0.35	0.54	0.74

¹Excludes Yukon and Northwest Territories.

SOURCE: DBS, *Census of Canada, 1961*, Vol. III, Part 1, Queen's Printer, Ottawa, 1963, Table 6; and *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 8.

Table 2.13 shows also the effect of the economic structure on the nature of the bundle of resources found in the health sector. The structure of the health sector is bound to be slightly different from one province to another, and thus one expects a slightly different composition of medical manpower.

The same comment applies to changes in structure over time. Thus, data presented in Table 2.14 on the composition of health professionals in the years 1941, 1951 and 1961 gives evidence of the changing composition of human health care resources. For example, dentists accounted for 6.31 per cent of the health care team in 1941 and for only 4.37 per cent in 1961. Now this could be the result of the demand for dental care not rising as fast as that for other health goods and services (this might be the case if governments entered the health sector to the extent of subsidizing the provision of hospital care and other medical care but not dental care). On the other hand, it might be the result of a set of licensing procedures which are used to prevent or at least retard entry to the field of dentistry.

Finally, we might note the data in Table 2.14 which indicate the increase in the relative size of the occupations of medical and dental technicians throughout Canada. This growth is another result of increased specialization in the health care field.⁶

Geographic Distribution

Human Resources

The levels of health care resources that exist in Ontario as described above must now be considered in the light of their geographic distribution; for, as someone has said, data on the average number of physicians per 10,000 persons are like a bikini—what they reveal is interesting, but what they conceal is vital! In certain rural areas health professionals are much fewer than these provincial data indicate; the opposite is true for metropolitan areas. In short, health professionals are not distributed as equally among densely and sparsely populated areas as the population itself. Summary information⁷ supporting these statements is presented in Table 2.15.

⁶This increase in specialization has been documented by S. Judek. In 1947 specialists accounted for 23.1 per cent of the total number of physicians; in 1961, they accounted for 51.1 per cent. See S. Judek, *op. cit.*, pp. 156-157.

⁷The absolute numbers of persons in the different health occupations and these numbers as a percentage of the Ontario aggregate in the different sizes of communities in Ontario for 1951, 1961, and 1966 are given in detail in Tables A224 to A237 in Appendix II. In each table and with respect to each individual community, data on total population in the community and this figure as a percentage of the total population in Ontario also are presented. This enables the reader to judge quickly whether a particular community has relatively more or relatively less of a given health occupation than the Ontario average. For example, in Table A225, it is clear that in 1961, communities with a population under 10,000 accounted for 27.5 per cent of Ontario's total population but for only 14.14 per cent of the total number of physicians

(... continued on p. 25)

TABLE 2.14

**Percentage Composition of Health Professionals, Canada and the Provinces,
1941, 1951 and 1961**

Province	Year	Health pros.	Phys. and surgs.	Dents.	Nurses, grad.	Nurses in training	(All nurses)	Osteos. and chiros.	Med. and dent. techns.
Canada ¹	1941	100.00	16.61	5.79	41.24	18.40	59.64	0.88	—
	1951	100.00	16.69	5.37	40.96	18.21	59.17	0.97	6.53
	1961	100.00	15.40	3.96	44.57	16.65	61.22	0.80	9.93
Newfoundland	1941	—	—	—	—	—	—	—	—
	1951	100.00	14.02	1.76	40.29	28.33	68.62	0.10	8.24
	1961	100.00	11.90	2.17	40.51	29.33	69.84	0.05	10.09
Prince Edward Island	1941	100.00	15.12	4.97	45.82	21.67	67.49	0.22	—
	1951	100.00	13.20	5.06	38.70	27.12	65.82	0.36	6.87
	1961	100.00	12.62	3.47	44.80	24.41	69.21	0.28	7.07
Nova Scotia	1941	100.00	14.17	4.83	43.96	25.02	68.98	0.39	—
	1951	100.00	15.88	4.83	41.91	22.39	64.30	0.48	5.81
	1961	100.00	12.51	3.03	46.90	21.76	68.66	0.34	9.46
New Brunswick	1941	100.00	12.33	4.61	43.95	25.72	69.67	0.54	—
	1951	100.00	12.46	3.87	40.47	28.30	68.77	0.70	6.21
	1961	100.00	12.11	2.87	52.93	16.13	69.06	0.42	9.37
Quebec	1941	100.00	22.15	6.08	42.64	13.82	56.46	0.33	—
	1951	100.00	21.46	5.40	38.42	17.96	56.38	.52	6.76
	1961	100.00	18.81	3.97	38.26	19.66	57.92	0.73	10.51
Ontario	1941	100.00	15.74	6.31	41.29	17.33	58.62	1.10	—
	1951	100.00	16.58	6.08	42.34	15.59	57.93	1.32	5.72
	1961	100.00	15.28	4.37	46.71	14.42	61.13	0.94	9.29
Manitoba	1941	100.00	15.58	4.97	34.64	26.01	60.65	1.21	—
	1951	100.00	17.59	5.18	34.48	18.83	53.31	0.86	9.07
	1961	100.00	15.16	3.40	40.94	17.50	58.44	0.59	12.86
Saskatchewan	1941	100.00	15.08	5.38	35.63	22.95	58.58	1.14	—
	1951	100.00	12.44	4.11	41.55	21.74	63.20	0.84	7.89
	1961	100.00	12.01	2.51	45.87	19.65	65.52	0.45	11.25
Alberta	1941	100.00	14.93	4.98	38.95	22.60	61.53	1.14	—
	1951	100.00	14.33	5.19	38.75	21.41	60.16	1.24	6.93
	1961	100.00	12.86	4.06	46.53	15.03	61.56	1.19	10.29
British Columbia	1941	100.00	13.04	5.17	44.36	17.07	61.43	1.03	—
	1951	100.00	13.27	4.90	44.75	17.21	61.96	1.02	6.72
	1961	100.00	14.53	4.30	48.19	13.17	61.36	0.90	8.96

¹Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

SOURCE: DBS, *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 8.

(Footnote 7 continued . . .)

in Ontario. A little simple arithmetic shows that these communities would require about 1,563 physicians and surgeons to give them as many physicians relative to the total number of physicians in the province as they have population relative to the population of Ontario. A word of caution is in order in the interpretation of distributional changes over time. The data for 1951 normally do not refer to metropolitan areas; thus communities under 10,000 persons, for example, that are part of major metropolitan areas but not part of the major "city" are included in the category of communities under 10,000 persons. Accordingly, it seems best to consider those classifications of communities that involve metropolitan areas, rather than cities with a population of 100,000 or more.

TABLE 2.15
Percentage of Ontario's Health Professionals in Metropolitan Areas and in
Centres of Population under 10,000, 1961

Profession	Percentage of Ontario Total	
	Metropolitan Areas	Population under 10,000
(Population)	52.1	27.5
Total health professionals	61.5	10.4
Physicians and surgeons	66.9	14.1
Dentists	64.3	9.5
Pharmacists	65.9	10.4
Nurses, graduate	57.1	16.1

SOURCE: See Appendix II.

The simple rural-urban distribution is not the only important one. Small towns near metropolitan areas are better off than small towns that are far from any developed centres. That is, regional differences exaggerate the problem of scarcity in particular communities. For example, in 1966 the counties of Algoma, Brant, Cochrane, Grenville, Kenora, Manitoulin, Muskoka, Nipissing, Northumberland, Parry Sound, Rainy River, Sudbury, Thunder Bay and Temiskaming (the Ontario Department of Health's Region No. 5) contained 12.7 per cent of the Ontario population, 9.24 per cent of its dentists, and 0.61 per cent of its dental specialists. Of the recognized dental specialists in Ontario, in 1966 59.4 per cent were in Metropolitan Toronto and its vicinity.⁸

Our final section on the geographic distribution of human health care resources is based on 1961 census data describing eleven different categories of health care personnel by county and census division.⁹ In order to summarize this infor-

⁸Detailed data on the geographical distribution of the different health occupations by region are presented in Tables A238 to A243. Table A239 gives 1961 data on the absolute size of the various health occupations and size relative to the Ontario aggregate, for each of the five health regions in Ontario (the composition of each region is set out in Table A238; similar data for 1966 are presented in Table A240).

Finally, this same type of information is set out for the ten economic regions in Ontario (the composition of each region is set out in Table A241; data for 1961 and 1966 are given in Tables A242 and A243, respectively).

Again, for each of the health regions and for each of the economic regions, we have presented information on the population of the region and this figure as a percentage of the total population in Ontario. The reader thus is able to see if a given region has a greater or smaller percentage of the total number of health personnel in Ontario than it has of Ontario's total population.

⁹The raw data on the population, the number of persons in the eleven health occupational groups, and the ratio of numbers in an occupational group to the population are set out in Table A244, Appendix II, for each county and census division in Ontario. Similar information for a slightly different set of occupational groups is set out for 1966 in Table A245. Again, information on total population also is provided.

mation, we have computed Gini's ratio of concentration.¹⁰ This measure gives an overall estimate of the equality of the distribution of persons in a particular health occupation in relation to population. Briefly, the closer this ratio is to zero, the more equal is the geographic distribution¹¹ of personnel. For example, a Gini's ratio of zero would indicate that the particular health occupational group was distributed equally throughout all counties and census divisions in Ontario; that is, a county with 10 per cent of the population would have 10 per cent of the total number of physicians and surgeons in Ontario, and a county with 2 per cent of the total population of Ontario would have 2 per cent of Ontario's total number of physicians and surgeons.

On the other hand, a Gini's ratio close to one would indicate that a county with one per cent of the population had 100 per cent of the total number of physicians and surgeons in Ontario.

Gini's ratios for the concentration of eleven different categories of health personnel, calculated for Ontario and for each of the other Canadian provinces, are presented in Table 2.16.

The data of this table are best used for purposes of comparison. First, with respect to any one health occupation, it is possible to compare the geographic distribution of this group in Ontario with that found in other provinces. For example, if we look at physicians and surgeons, the Gini's ratio of .204 in Ontario is the third lowest of all the provinces (British Columbia with .149 is lowest, followed by Prince Edward Island with .200). Accordingly, we may conclude tentatively that physicians and surgeons are relatively more equally distributed in Ontario than they are in seven other provinces.

Second, with respect to any given province, it is possible to compare the geographic distribution of the different health occupational groups with each other. For example, of the major health occupational groups in Ontario, graduate nurses appear to be most equally distributed (a Gini's ratio of .119) and physio-occupational therapists most unequally distributed (a ratio of .348) of the nine distinct groups considered.¹²

¹⁰The algebraic meaning of Gini's ratio, its relation to the Lorenz curve, and the method of calculation are all described clearly in W. S. Woytinsky, *Earnings and Social Security in the United States*, Social Science Research Council, Washington, 1943, Note B, Appendix Notes, pp. 251-255.

¹¹Strictly speaking, we should be talking about the demographic distribution. Although similar to the geographic distribution, it is different. The former would refer to the number of physicians per square mile, for example, whereas the latter refers to the number of physicians in relation to population.

¹²Indivisibilities of capital would lead to the expectation that the unequal distribution of health personnel in any given health occupation is a positive function of the average asset value of the personnel. That this expectation is not entirely confirmed by the data probably results from two factors: the source of our data (a physician may serve two or more counties); and the interdependence of these human resources with themselves and with non-human resources (physio-occupational therapists work primarily in hospitals, whereas dentists often work as solo practitioners).

TABLE 2.16
Gini's Ratio of Concentration of Medical Personnel and of Hospital Beds in Canada, by Province, 1961

Province	Health Professionals	Physicians and Surgeons	Dentists	Nurses, grad.	Nurses in training	Physio-Occupational therapists	Optometrists	Osteopaths and Chiropractors	Pharmacists	Med. Dent. x-ray technicians	Other Health Professionals	Hospital beds
Nfld.	.421	.237	.286	.401	.544	.539	.587	.587	.452	.386	.513	.335
P.E.I.	.229	.200	.152	.238	.237	.498	.562	.195	.095	.214	.396	.250
N.S.	.243	.233	.164	.187	.416	.572	.218	.512	.243	.306	.572	.225
Que.	.312	.306	.270	.306	.384	.546	.283	.325	.344	.345	.455	.416
Ont.	.150	.204	.176	.119	.292	.348	.176	.231	.206	.241	.365	.347
N.B.	.242	.274	.310	.238	.371	.658	.222	.591	.305	.370	.562	.475
Man.	.262	.294	.308	.194	.391	.385	.271	.303	.264	.347	.371	.356
Sask.	.279	.331	.221	.241	.471	.447	.274	.280	.224	.390	.607	.330
Alta.	.191	.218	.186	.161	.287	.359	.189	.162	.193	.274	.385	.370
B.C.	.126	.249	.116	.087	.216	.214	.101	.142	.148	.145	.275	.143

Non-Human Resources

Hospital resources on one count appear to be not as unequally distributed geographically as health care personnel.¹³ For instance, the same region of Ontario mentioned above, Ontario Department of Health's Region No. 5, which contained 12.7 per cent of the Ontario population in 1964, contained 13.5 per cent of Ontario's hospital beds.

On the other hand, referring to the data in Table 2.16, the Gini ratio of concentration of hospital beds in Ontario of .347 is higher than all the Gini's ratios for the major groups of health personnel in Ontario, except for physio-occupational therapists mentioned above. However, as the basic units for the calculation of Gini's ratios are the data for a single county or census division and as a hospital in a county may serve one or more other counties, the Gini's ratio of the concentration of hospital beds is probably less suitable for comparing distribution of hospital beds with the distribution of health care personnel than it might be with other units.

Five provinces show a more equal distribution of hospital beds than Ontario. (This conclusion of course is subject to the limitations of the data noted above.)

International Comparisons

Finally, we examine the scarcity of particular types of health care resources in Ontario by comparing their levels with those that exist in certain developed Western countries. This comparison is made in Table 2.17. Compared with fourteen countries (including Canada) in 1963, Ontario stood ninth with respect to physicians per 10,000 population, and twelfth with respect to pharmacists per 10,000 population. In 1960, Ontario stood eleventh with respect to hospital beds per 1,000 persons.

These international data, more than the data relating either to other Canadian provinces or to other periods of time in Ontario, reflect the different solutions to the economic problem of providing health care that are applied in other countries; that is, they reflect the effect of different economic structures on the nature of the bundle of health care resources that are found in any given country. In particular, we might note the contrast between the mix of human and non-human resources found in Sweden and that found in Israel. Sweden has the second lowest number of physicians per 10,000 persons of the countries examined in Table 2.17, but it has the largest number of hospital beds per 1,000 persons. Israel has the highest number of physicians per 10,000 persons, but the lowest number of hospital beds per 1,000 persons.

¹³In the tables of Appendix II we have, where possible, included data on the absolute number of hospital beds in a particular area and on this number as a percentage of the total number of hospital beds in Ontario. Accordingly, the distribution of beds may be compared with the distribution of population and also with the distribution of different groups of health personnel. But see footnote 11 on p. 27.

TABLE 2.17
Health Care Resources, Ontario, Canada and Selected Countries, 1963

Province or country	Pharmacists per 10,000 population	Midwives ¹ per 10,000 population	Dentists per 10,000 population	Physicians per 10,000 Population	Hospital beds per 1,000 persons — 1960 (average 1959-61)
Ontario ²	11.5	3.89	—	3.44 ¹⁰	9.90
Canada	11.1	3.16	—	4.39	10.77
Sweden	10.4	7.36	2.34	3.24	15.59
Finland	7.2	4.40	0.53	7.78	11.64
Norway	12.0	7.13	2.55	3.45	10.44
United States ³	14.4 ⁶	5.57 ⁷	—	6.19	9.15
Britain					
(England and Wales) ⁴	11.8	2.71	3.50 ⁸	5.09	10.49
France ⁵	11.5	3.51	2.06	4.13	13.36
Netherlands	11.4	2.27	0.65	0.75	9.24
Japan	10.8	3.49	4.81	6.76	7.38
Denmark	13.2	5.72	1.34	3.62	10.44
Switzerland	13.2	5.67	2.91	2.61	12.63
Israel	23.2	5.01	1.47	5.76	7.13
Australia	13.6	3.95	—	9.02	11.44
New Zealand	14.38	3.94	2.75 ⁹	5.51	12.41

¹Includes nurses with midwifery certificate.

²Ontario data are for 1964.

³Excludes civilian population — absent from country for an extended period of time (at 1960: 764, 701).

⁴Including armed forces stationed outside country and merchant seamen at sea, but excluding other Commonwealth and alien armed forces stationed in the area.

⁵De jure population, but excluding diplomatic personnel outside the country and including members of alien armed forces not living in military camps and foreign diplomatic personnel not living in embassies or consulates.

⁶Includes osteopaths.

⁷This is the number registered; all are not necessarily resident or practising.

⁸Data refer to personnel in government public health service only.

⁹Data refer to government public service only.

¹⁰From *Census of Canada*.

SOURCE: United Nations, *Statistical Yearbook, 1966*, p. 693. Their data were compiled from Volume III, "Statistics of Health Personnel and Hospital Establishments", of the *World Health Statistics Annual of the World Health Organization*.

Note: As a rule data refer to all persons fully qualified or certified from a medical school, dental school, midwifery school or school of pharmacy. Auxiliary personnel permitted, in certain countries, to carry out some of the work usually performed by physicians, dentists, midwives and pharmacists, and assistant personnel are not included in the table. Detailed information on the number of personnel by country can be obtained from the source mentioned above. Unless otherwise stated, data are assumed to include persons actually working in the country, whether in government public health and medical services, in private medical services, or in private practice. However, due to lack of precise information for many countries regarding either the professional level of the personnel or the real number actually working in the country, great caution should be exercised making comparisons between countries.

Conclusion

We have deliberately relegated the far more detailed information on the supply of health care resources to Appendix I. In this way, we have attempted to emphasize the overall significance of such information in an evaluation of the structural organization of health care resources. In the face of scarcity, it is necessary to use these diverse resources as efficiently as possible if the economic problem of providing health care is to be solved satisfactorily. The solution to this problem thus must involve a structural organization which permits each of the hundreds of thousands of different health care resources to perform efficiently.

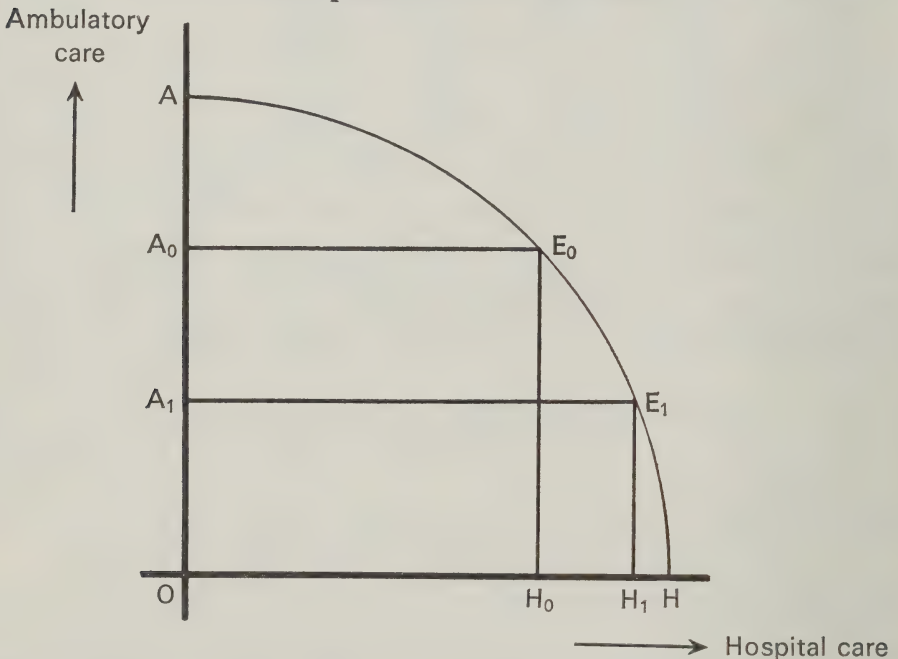
Chapter 3 Health Goods and Services

The second principal element of the problem of providing health care is the multiplicity of producible health goods and services.

Given the state of medical knowledge, any one of a vast range of health goods and services could be produced by the given stock of health care resources; because the stock of health care resources is limited, however, not all of them can be produced either at the same time or in unlimited quantities.

Society can produce only a limited quantity of any given health service if it allocates all its health care resources to the production of this service. If society chooses to produce two or more health services, then it can produce even less of each good. This point is illustrated in Figure 3.1.

Figure 3.1. The multiplicity of health goods and services, not all of which can be produced at the same time



For example, although it is possible to provide OH hospital care if no ambulatory care is provided, once society begins using resources to provide ambulatory care in the amount OA_0 , for example, then only OH_0 of hospital care can be provided. In short, it is necessary to choose some point, such as E_0 , on the production-possibility curve. We cannot have as much of both ambulatory and hospital care as we could have if we produced only one or the other.

The purpose of this chapter, again, is two-fold. First, we draw attention to the vast range of health goods and services that could be produced. Second, we indicate the nature of the particular bundle of health goods and services that are in fact provided in Ontario as a direct outcome of the way in which the particular structure of the health sector in Ontario affects the use of the resources described in Chapter 2.

Definition of Health Goods and Services

Health goods and services have been defined as follows, to include medical care services, public health services, and research and teaching:

In addition to services that lie clearly within the health field, the following are also included: services given to facilitate physiological processes such as pregnancy and delivery and to safeguard the health of mother and child; such preventive measures as vaccination and immunization, periodic medical examinations of school children, the medical screening of apparently healthy individuals for the detection of pathologic lesions such as tuberculosis, cancer and the like; such promotive measures as nutritional services to vulnerable groups such as pregnant mothers, infants, pre-school children and school children; measures for health education other than those provided in general education; the care of the eyes, ears and teeth not only by specialist treatment but also by the provision of hearing aids, dentures, spectacles and other appliances; plastic surgery that is medically prescribed; and the transport costs of sick or injured persons by ambulance services and/or persons accompanying the patient when the accompaniment was ordered by a physician and was indirectly paid for. All these health services for the whole population, military (including veterans), as well as civilian, in institutions (including prisons), as well as at home¹

Measures of the Supply of Health Goods and Services

Direct measures of the health goods and services provided in Ontario thus would be the number of prescriptions filled; the number of physician consultations in home, office or hospital, or by telephone; the number of patient days of hospital care, and so on. Because the quality or value of such prescriptions and of such physician consultations varies widely, the simple total number of prescriptions or consultations is all but meaningless as an overall measure of the value of these particular types of health care. Data in Table 3.1 indicate the number of prescriptions written and dispensed, and data in Table 3.2 show the number of hospital admissions by type of hospital.

In an attempt to overcome this aggregation problem, recourse often is made to information on the total value, as measured in terms of dollars, of prescriptions filled or of consultations made. The implicit assumption involved in this procedure is that the price charged for prescriptions and consultations represent equilibrium market prices which result from the interplay of highly competitive forces. If these

¹B. Abel-Smith, *Paying for Health Services in Six Different Countries*, Public Health Report No. 17, World Health Organization, Geneva, 1963, p. 25.

TABLE 3.1
The Prescription Market,¹ New Prescriptions Only, Canada and the Provinces, 1965

Province	Rx written per working day	Rx written per working day per physician	Rx dispensed per working day	Rx dispensed per working day per physician	Total Rx written and dispensed per working day	Total Rx written and dispensed per working day per physician
Canada	242,887	11.84	36,843	1.79	279,730	13.63
Newfoundland	3,902	14.35	1,013	3.73	4,915	18.08
Prince Edward Island	1,158	12.86	260	2.89	1,418	15.75
Nova Scotia	8,798	11.89	1,408	1.90	10,206	13.79
New Brunswick	5,743	12.19	1,001	2.12	6,744	14.31
Quebec	58,762	10.59	12,501	2.26	71,263	12.84
Ontario	89,107	11.64	15,782	1.99	104,889	13.63
Manitoba	13,724	13.66	959	.95	14,683	14.61
Saskatchewan	15,903	16.67	1,110	1.16	17,013	17.83
Alberta	18,261	12.57	1,410	.97	19,671	13.54
British Columbia ²	27,529	12.06	1,399	.61	28,928	12.67

¹For definitions, see source.

²Includes Yukon and Northwest Territories.

SOURCE: *The Canadian Medical Market by Counties*, Seccombe House, Toronto, 1965.

TABLE 3.2
Admissions¹ Reported, by Type of Hospital, Canada² and the Provinces, 1964

Province	All hospitals	General and allied special				Mental	Tuberculosis
		Total	General	Allied	Special		
Canada	3,179,242	3,119,852	3,020,070	99,782		48,878	10,512
Newfoundland	59,179	57,660	55,569	2,091		1,072	447
Prince Edward Island	18,059	17,372	17,280	92		608	79
Nova Scotia	120,136	117,241	112,662	4,579		2,407	488
New Brunswick	110,042	107,410	106,090	1,320		1,575	1,057
Quebec	806,099	788,644	748,145	40,499		13,666	3,789
Ontario	1,059,099	1,040,656	1,011,870	28,786		16,046	2,397
Manitoba	177,681	174,680	170,371	4,309		2,285	716
Saskatchewan	213,356	211,448	210,188	1,260		1,550	358
Alberta	290,572	286,890	277,403	9,487		3,102	580
British Columbia	315,557	308,389	301,662	6,727		6,567	601

¹Adults and children only.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. II, Queen's Printer, Ottawa, 1964, Table 7.

forces are not present, total expenditures on health goods and services will not necessarily be a reasonable estimate of their real value. The mixture of the free market-price system and government participation in the health sector in Ontario suggests that total expenditure figures will be only approximate.

The data in Table 3.3 show the estimated value of prescribed drugs sold by retail stores,² and data in Table 3.4 indicate hospital expenditures per capita.

In the absence of comprehensive and comparable data on either the number of health goods and services provided or the total expenditure on them by individuals and society, recourse sometimes is made to numbers of various types of health care resources. For example, in the absence of data on both the total number of health care activities carried on by all physicians and the value of these activities, the simple number of physicians actively practising medicine in a given area often is used as a fairly good approximation of the amount of health care provided in this area.³

TABLE 3.3
Estimated Per Capita Sales of Prescribed Drugs by Retail Drugstores,
Canada and the Provinces, 1953-1959
(dollars)

Province	1953	1954	1955	1956	1957	1958	1959
Canada	3.29	3.41	3.79	4.47	5.09	5.29	6.09
Newfoundland	0.99	1.17	1.37	1.40	1.89	1.96	2.21
Prince Edward Island	1.85	2.11	2.41	2.35	3.03	3.22	3.61
Nova Scotia	2.30	2.67	3.08	3.05	4.02	4.15	4.51
New Brunswick	3.07	3.65	4.32	4.37	5.90	6.24	7.01
Quebec	2.67	2.92	3.22	3.59	4.24	4.62	5.41
Ontario	3.52	3.49	4.01	5.10	5.60	5.72	6.71
Manitoba	5.35	4.31	4.14	4.34	5.23	5.17	5.93
Saskatchewan	4.68	4.09	4.69	5.67	6.33	6.63	6.23
Alberta	3.53	4.40	4.29	5.59	6.18	6.25	7.20
British Columbia ¹	3.42	3.98	4.61	5.12	5.42	5.54	6.64

¹Includes Yukon and Northwest Territories.

SOURCE: Department of National Health and Welfare, *Expenditures on Personal Health Care in Canada 1953-1961*, Health Care Series Memorandum Number 16, Ottawa, March 1963, Table 26.

²The volumes of the Royal Commission on Health Services, 1964, contain a great deal of information on expenditures on health care services in Canada.

³Using estimates of the stock of human and non-human resources to indicate the amount of health care provided frequently leads to confusion. The distinction between health care resources and health goods and services is real and useful: the former describe production possibilities; the latter describe output. Use of the former to indicate the latter is sometimes necessary and, when done, requires the careful attention of both writer and reader.

TABLE 3.4

Estimated Per Capita Revenue Fund Expenditure of Public General and Allied Special Hospitals, Canada¹ and the Provinces, 1959-1964

(dollars)

Province	1959	1960	1961	1962	1963	1964
Canada	31.06	34.90	38.32	41.63	46.80	51.36
Newfoundland	22.60	25.25	25.39	25.69	29.72	36.46
Prince Edward Island	22.63	26.74	30.85	31.54	33.57	37.22
Nova Scotia	25.71	30.32	33.76	36.67	40.36	44.96
New Brunswick	29.73	35.39	40.07	42.94	47.23	50.37
Quebec	26.70	30.14	34.34	37.84	45.79	51.49
Ontario	32.94	37.66	41.76	46.05	50.43	55.08
Manitoba	31.47	34.99	39.09	41.03	45.16	47.37
Saskatchewan	43.10	45.85	45.46	45.90	51.64	56.12
Alberta	34.71	36.58	38.50	42.36	46.19	50.65
British Columbia	33.48	37.12	39.49	41.51	43.77	45.74

¹Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics*, Vol. VI, Queen's Printer, Ottawa, 1964, Statement 3.

Accurate, comprehensive data on the volume of health goods and services are not readily available for Ontario. Accordingly, the reader first is redirected to the information on health care resources presented in Chapter 2. In particular, he is referred to the detailed resource inventory presented in Appendix I and the detailed information on the geographic distribution of health care resources presented in Appendix II. This information on the level and distribution of health care resources provides a fairly clear idea of the types of health goods and services available in Ontario, as well as information on their quality and quantity. In addition, the data on health care resources in other provinces and in other countries can be used to compare roughly the health care provided in Ontario with that in these other areas.

Finally, some information on the quantity and quality of health care *not provided* can be derived from data on the extent of illness and death in the community. Tables 3.5 and 3.6 contain data on infant mortality and standardized (age-adjusted) death rates, respectively, for Canada and each of the provinces from 1954 to 1964. Infant mortality is seen to be consistently lower in Ontario than in Canada on average and in the provinces taken separately over the period. The same is not true of standardized (age-adjusted) death rates. Ontario rates remain close to those for the whole of Canada and are generally higher over the period than the rates found in every other province except Newfoundland and Quebec.

Similar data and data describing life expectancy at birth and at forty years of age are presented in Tables 3.7 and 3.8 for Ontario, Canada and thirteen other countries. Infant mortality occurs more frequently in Ontario than in all the other countries noted, with the exception of Japan, France and the United States. The life expectancy data, however, do not rank Ontario in such an unfavourable position.

TABLE 3.5
Infant Mortality per 1,000 Live Births, Canada¹ and the Provinces, 1954-1964

Year	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1954	31.9	41.1	34.9	30.0	39.9	40.3	25.8	28.5	28.3	26.3	25.8
1955	31.3	42.3	34.5	29.8	37.4	37.8	26.0	31.1	30.1	25.8	25.3
1956	31.9	43.3	39.5	29.0	39.6	40.8	25.2	30.8	28.3	24.6	26.0
1957	30.9	39.4	28.0	27.2	34.6	38.2	25.0	31.8	25.5	27.0	28.3
1958	30.2	38.6	32.5	29.5	34.6	36.4	24.9	30.2	25.8	25.3	27.2
1959	28.4	38.9	31.3	31.0	32.5	33.3	24.0	27.0	25.7	24.2	24.9
1960	27.3	35.9	32.2	29.5	29.9	30.2	23.5	30.0	26.4	26.2	23.6
1961	27.2	37.7	32.8	27.8	26.2	31.5	23.0	25.2	25.8	26.8	24.5
1962	27.6	39.6	31.0	31.6	30.2	31.8	23.2	26.2	25.9	25.4	23.0
1963	26.3	38.3	21.4	27.0	27.6	30.0	22.8	24.7	27.1	23.6	23.5
1964	24.7	31.1	26.4	25.3	26.1	27.4	21.3	25.5	26.0	23.9	22.8

¹Includes Yukon and Northwest Territories.

SOURCE: DBS, *Vital Statistics*, Queen's Printer, Ottawa, 1964.

TABLE 3.6
Standardized (Age-adjusted) Death Rates, Canada¹ and the Provinces, 1954-1964

Year	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1954	8.2	8.0	7.5	7.7	7.8	9.0	8.1	7.6	7.0	7.7	7.9
1955	8.2	8.8	6.8	7.9	9.0	9.0	8.0	7.6	7.2	7.9	7.8
1956	8.2	8.3	7.3	7.5	8.1	9.1	8.1	7.6	7.1	7.4	7.9
1957	8.3	8.8	7.0	7.7	8.0	9.2	8.2	7.8	7.1	7.6	7.7
1958	8.0	8.5	7.1	7.8	7.7	8.8	7.9	7.4	6.6	7.3	7.5
1959	8.0	8.4	7.5	8.0	7.9	8.7	8.0	7.5	6.9	7.2	7.5
1960	7.8	7.9	7.1	7.5	7.7	8.2	7.9	7.4	6.6	7.3	7.4
1961	7.6	7.6	7.1	7.4	7.5	8.4	7.6	7.0	6.7	7.0	7.1
1962	7.6	7.9	7.7	7.5	7.6	8.2	7.6	6.9	6.4	7.0	7.0
1963	7.6	7.7	7.0	7.4	7.5	8.2	7.7	7.2	6.7	7.0	7.1
1964	7.3	7.3	7.3	7.4	7.4	7.9	7.3	6.9	6.5	6.8	7.3

¹Includes Yukon and Northwest Territories.

SOURCE: DBS, *Vital Statistics*, Queen's Printer, Ottawa, 1964.

The remainder of the chapter is devoted to a presentation of data that illustrate the broad choices that have been made in Ontario in the framework of the broad set of alternative choices of which health goods and services to provide and which not to provide. The lack of comprehensiveness reflects scarcity of data. Probably the first set of choices that individuals and society make is whether health care should be provided in the hospital setting or through individual health professionals on an ambulatory basis. Referring to Figure 3.1, there is a wide range of choices: the given stock of health care resources can be used to provide hospital care, or ambulatory care, or some combination of the two as might be represented by the point E_0 in the diagram.

TABLE 3.7

**Levels of Health — Crude Death Rate and Infant Mortality Rate,
Ontario, Canada and Selected Countries, 1963**

Country	Crude Death Rate ¹	Infant Mortality Rate ²
Ontario	8.3	22.8
Canada ³	7.8	26.3
Sweden	10.1	15.4
Finland ⁴	9.2	18.2
Norway ⁵	10.1	16.9
United States	9.6	25.2
Britain (England and Wales)	12.2	21.1
France ⁶	11.7	25.4
Netherlands ⁷	8.0	15.8
Japan ⁸	7.0	23.2
Denmark ⁹	9.8	19.1
Switzerland	9.9	20.5
Israel	6.0	22.7
Australia ^{10, 11}	8.7	19.5
New Zealand ^{10 12}	8.8	19.6

¹The number of deaths (exclusive of foetal deaths) per 1,000 population.

²Deaths of infants under one year of age per 1,000 live births. Data exclude foetal deaths.

³Includes deaths of Canadian residents temporarily in U.S., but excludes deaths of U.S. residents temporarily in Canada.

⁴Includes data on nationals temporarily outside country.

⁵Includes those who were temporarily outside the country.

⁶Includes deaths among national armed forces wherever stationed.

⁷Includes those on the population register who are outside the country.

⁸Deaths are for Japanese nationals only, but rates are computed on population including foreigners except applied military and civilian personnel and their dependents stationed in the country, numbering 48,106 in May 1959.

⁹Excluding Faeroe Islands and Greenland. Including armed forces stationed outside the country.

¹⁰Data tabulated by year of registration rather than occurrence.

¹¹Excluding full-blooded Aborigines; estimated at 46,638 in June 1947, 38,319 in June 1954; and 40,081 in June 1961. Population figure excludes also armed forces stationed outside the country, numbering 48,106 in May 1959.

¹²The population figure excludes the diplomatic personnel and armed forces outside the country (the latter number 2,559 at the 1961 census) and alien armed forces within the country.

SOURCE: United Nations, *Demographic Yearbooks, 1950-1965*, New York; DBS, Vital Statistics Division, unpublished data.

TABLE 3.8
Levels of Health — Life Expectancy at Birth and at Forty Years,
Ontario, Canada and Selected Countries

	Year	Life Expectancy at Birth		Year	Life Expectancy at 40 Years	
		Male	Female		Male	Female
Ontario	1960-62	68.31	75.32		32.37	37.33
Canada	1960-62	68.37	74.21	1960-62	33.00	37.50
Sweden	1962	71.32	75.39	1962	34.50	37.59
Finland	1956-60	64.9	71.57	1956-60	29.72	34.96
Norway	1956-60	71.32	75.57	1956-60	35.19	38.14
United States	1964	66.9	73.7	1963	31.2	36.7
Britain (England & Wales)	1961-63	67.9	73.9	1961-63	31.4	36.5
France	1964	68.0	75.1	1963	31.3	37.1
Netherlands	1956-60	71.4	74.8	1960	34.7	37.9
Japan	1964	67.67	72.87	1963	31.79	35.89
Denmark	1962-63	70.3	74.4	1961-62	34.0	37.0
Switzerland	1959-61	69.5	74.8	1960-62	33.7	37.6
Israel	1964	70.19	72.93	1963	31.84	36.99
Australia	1960-62	67.92	74.18	1960-62	34.64	35.90
New Zealand	1960-62	68.44	73.75	1955-57	32.82	36.35

SOURCE: United Nations, *Demographic Yearbooks, 1950-1965*, New York; DBS, Vital Statistics Division, unpublished data.

An idea of the particular mix chosen by Ontario can be gathered from Table 3.9 which presents data on total per capita expenditures on broadly defined hospital care and non-hospital medical and dental care for the years 1959 to 1965.⁴

Note the changing composition of these expenditures from non-hospital to hospital care.

It is clear from the data in this table that a mixture of hospital and ambulatory care different from the existing one is not only possible, but indeed was present some years ago.

Recalling the data presented in Table 2.17 of Chapter 2, on the number of physicians per 10,000 persons and the number of hospital beds per 1,000 persons for several countries other than Canada, we find further evidence that there is potentially a wide range of choices among different combinations of hospital and ambulatory care. More direct evidence of the different possible mixes of hospital and ambulatory care is found in Table 3.10, wherein we present data on a breakdown of current expenditure on health services for sixteen different countries. The percentage of total expenditures spent on hospital care varies from a low of 36.2 per cent in the United States to a high of 59.9 per cent in Finland.

⁴Similar historical information is given in *Report of the Royal Commission on Health Services*, Vol. 1, Queen's Printer, Ottawa, 1964.

TABLE 3.9
Expenditures on Hospital and Non-Hospital Care, Canada, 1959-1965
(millions of dollars)

Year	Total personal and medical care and death expenditures	Medical and dental care expenditures	Hospital care, pri- vate duty nursing, accident and sick- ness insurance, prepaid med. care expend.	Med. and dental care expend. as a percentage of total expenditures	Hospital care expend., etc. as a percentage of total expend.	Med. and dent. care expend. as a percentage of total personal expenditure on goods and services	Hosp. care expend., etc. as a percentage of total personal ex- pend. on goods and services
1959	1,769	370	719	.209	.406	.016	.032
1960	1,925	395	818	.205	.425	.017	.035
1961	2,045	415	906	.203	.443	.017	.037
1962	2,204	458	995	.208	.451	.018	.038
1963	2,396	497	1,118	.207	.467	.018	.041
1964	2,613	547	1,250	.209	.478	.018	.042
1965	2,841	600	1,376	.211	.484	.019	.043

SOURCE: DBS, *National Accounts and Balance of Payments Division, National Accounts Income and Expenditure*, Queen's Printer, Ottawa, 1965.

TABLE 3.10
Breakdown of Current Expenditure on Health Services

Country	Total Current Expenditure Excluding Depreciation (millions)	Personal Health Services				Non-personal Public Health Services			
		Total Personal Health Services	Provided Through Hospitals	Balneological and Convalescent Institutions	Other Personal Health Services	Expenditure	%	Expenditure	%
Australia	A£ 346	334	1511	43.71	—	183	52.9	6.59	1.9
Canada	C\$ 2,045	1,988	8742	42.72	—	1,114 ²	54.5 ²	20.7	1.0
Ceylon	Rps 214	201	1072	50.02	—	94.0 ²	43.9 ²	9.6	4.5
Czechoslovakia	Kcs 7,264	6,633	3,018	41.6	447	3,168	43.6	174	2.4
Federation of Rhodesia and Nyasaland	£ 21.3	21.0	—	—	—	—	—	—	—
Finland	F. Mk 691	662	414	59.9	—	—	—	0.3	1.4
France ⁴	Fr 16,374	15,833	6,660 ¹	40.7	38	248	35.9	17.5	2.5
Israel	I£ 320	306	145	45.3	1.32	9,135	55.8	279	1.7
Kenya	£ 8.55	7.57	—	—	—	160	50.0	5.30 ³	1.6
Netherlands ⁴	G 2,344	2,160	—	—	—	—	—	0.71	8.3
Poland	Zl 17,157	15,979	6,242	36.4	605	9,132	53.2	55.2	2.4
Sweden	Kr 3,683	3,510	1,947	52.9	—	1,563	42.4	473	2.8
Tanganyika	£ 5.36	5.09	2.40	44.8	—	2.69	50.2	44	1.2
United Kingdom	£ 1,088	1,045	559	51.4	4.3	482	44.3	0.25	4.3
U.S.A. ⁴	U.S.\$ 29,859	28,397	10,795 ²	36.2 ²	616	16,986 ²	56.9 ²	20.3	1.9
Yugoslavia	Din 169,824	158,177	69,080	40.7	4,386	84,711	49.9	94.5	0.3
								6,574 ⁵	3.9
								5,073	3.0

¹Includes convalescent homes.

²A certain amount of expenditure on hospitals is included in "other personal health care".

³Includes a sum of £3,000 representing direct payments for veterinary public health and control of zoonoses.

⁴Including depreciation.

⁵Includes a sum of Din 2,000,000,000 representing direct payments for veterinary public health and control of zoonoses.

SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers No. 32, World Health Organization, Geneva, 1967, pp. 56-57.

TABLE 3.11
Selected Services, Public General and Allied Special Hospitals, Canada¹ and the Provinces, 1964

Province	Autopsies ²	Obstetrical deliveries	Units of lab. ³ work	Operations	Radiation treatments	Radiology films taken
Canada	34,878	433,513	99,950,215	2,319,561	323,637	17,161,067
Newfoundland	640	12,648	1,333,798	28,989	10,955	339,837
Prince Edward Island	155	2,753	383,102	8,730	641	90,677
Nova Scotia	906	18,449	1,908,460	93,153	31,683	859,071
New Brunswick	921	15,299	859,882	77,942	15,468	518,116
Quebec	6,997	119,026	33,155,025	584,041	157,597	4,927,187
Ontario	13,175	150,864	36,387,068	831,063	80,196	6,415,203
Manitoba	3,247	20,748	4,504,993	128,400	5	644,469
Saskatchewan	2,510	22,362	5,964,078	151,331	12	1,062,490
Alberta	2,260	35,296	7,084,457	166,908	2,197	959,867
British Columbia	4,059	35,565	8,334,961	246,362	24,883	1,333,814

¹Includes Yukon and Northwest Territories.

²Includes autopsies done outside the hospital.

³Units are laboratory standard units — see glossary in source: work done for inpatients only.

SOURCE: DBS, *Hospital Statistics*, Vol. II, Queen's Printer, Ottawa, 1964, Tables 3, 7, 10, 11, 12 and 13.

We now turn to look at the different possible types of hospital care that we can provide with our given stock of hospitals and hospital personnel. A summary description of the existing range of hospital services is presented in Tables 3.11 and 3.12. The provincial variations in the mix of hospital care services is particularly in evidence through the data of Table 3.12 on the distribution of hospital beds by type of treatment.

It takes little imagination to conceive of a much larger percentage of our hospital beds being devoted to the care of the elderly and correspondingly a much lower percentage devoted to surgical and maternity cases. On the broader horizon, we can conceive of a larger percentage of hospitals being devoted to the care of mentally ill patients and correspondingly a much lower percentage devoted to general and special hospital care. The existing breakdown of hospitals by type of care in the different provinces is presented in Table 3.13.

In a similar manner we might look at the mix of ambulatory services now being provided. In Table 3.14 we represent some of the findings from the recently completed survey of general practice.⁵

The general conclusions of Clute's study, namely that many general practitioners were not performing the activities that they were trained to perform and that they should have performed, suggest clearly that a different mix of health services obtainable from the existing stock of general practitioners is not only possible but desirable.

A second source of information is the utilization report of Trans-Canada Medical Care Plans. We have presented this information in Table 3.15. Note the large variation in the number of different services per 1,000 persons from one plan to another.⁶

Finally, we present data in Table 3.16 which describe the variations in the mix of expenditures on health goods and services found in seventeen different countries. For countries supplying complete returns, the services of university-trained medical and dental personnel are seen to account for 27.8 per cent of total expenditures in Canada and only 9.9 per cent in Czechoslovakia. More broadly, payments for health services range from a high of 73.0 per cent of total current expenditures in Tanganyika to a low of 36.7 per cent in Czechoslovakia. In contrast, payments for appliances and medicaments, as a percentage of current expenditure on all personal health services, range from a high of 38.9 per cent in Poland to a low of 5.2 per cent in Singapore.

⁵K. F. Clute, *The General Practitioner*, University of Toronto Press, Toronto, 1963.

⁶Historical information on utilization is available annually since 1955 from Trans-Canada Medical Plans.

TABLE 3.12
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied
Special Hospitals, by Type of Treatment, Canada² and the Provinces, 1964

Province	Beds set up Dec. 31	Total	Med. and surg.	Obstetric	Paed.	Psych.	Tuber-cul.	Isol.	Intensive care	Chronic, convalescent, geriatric	Rehab.	Other
Canada	115,403	100.0	57.1	11.5	13.9	1.6	0.1	1.1	0.6	12.8	1.2	0.1
Nfld.	2,499	100.0	61.4	12.3	17.0	0.3	1.8	2.5	0.1	2.6	2.0	—
P.E.I.	629	100.0	57.5	13.5	16.8	—	—	2.4	1.6	3.7	4.5	—
N.S.	4,082	100.0	62.4	15.7	16.0	1.5	—	1.8	0.8	1.3	0.5	—
N.B.	3,659	100.0	62.2	13.0	18.2	1.2	—	0.3	—	4.0	1.1	—
Que.	29,460	100.0	55.4	10.8	15.7	1.6	0.1	2.0	0.5	13.3	0.6	—
Ont.	40,359	100.0	57.2	11.0	12.1	1.6	—	0.1	0.8	17.0	0.2	—
Man.	6,021	100.0	54.7	11.8	13.0	2.7	—	1.0	0.6	13.5	2.7	—
Sask.	7,733	100.0	60.8	11.6	14.6	2.3	—	1.8	0.4	5.9	1.8	0.8
Alta.	10,958	100.0	51.4	11.4	11.5	0.9	—	0.9	0.5	20.3	3.1	—
B.C.	9,706	100.0	63.3	12.2	14.9	1.1	0.3	2.1	0.1	2.6	3.4	—

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1964, Table 18.

TABLE 3.13
Average Daily Number of Patients¹ Reported, by Type of Hospital, Canada²
and the Provinces, 1964

Province	All hospitals	General and Allied Special			Mental	Tuberculosis
		Total	General	Allied Special		
Canada	179,725	105,998	88,531	17,467	69,142	4,585
Newfoundland	2,848	1,881	1,764	117	804	163
Prince Edward Island	873	480	455	25	340	53
Nova Scotia	6,674	3,664	3,529	135	2,777	233
New Brunswick	5,585	3,273	3,117	156	1,973	339
Quebec	50,869	28,447	21,281	7,166	21,027	1,395
Ontario	63,041	38,134	31,794	6,340	23,822	1,085
Manitoba	9,292	5,490	4,554	936	3,400	402
Saskatchewan	10,413	6,088	5,544	544	4,029	296
Alberta	14,009	8,860	7,198	1,662	4,852	297
British Columbia	15,867	9,427	9,047	380	6,118	322

¹Adults and children only.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. II, Queen's Printer, Ottawa, 1964, Table 10.

TABLE 3.14
Non-hospital Visits of Physicians, Ontario and Nova Scotia

Category	Rate per 100 beds	
	Ontario	Nova Scotia
Prenatal care (without abnormal symptoms)	7.2	6.3
Acute upper respiratory infections	6.5	5.9
Symptoms, senility, and ill-defined conditions	5.4	5.5
Persons receiving prophylactic inoculation and vaccination	5.3	5.6
Infections of skin and subcutaneous tissue	3.3	3.2
Psychoneurotic disorders	3.2	2.5
Essential benign hypertension	3.0	3.8
Influenza	2.8	5.6
General medical or laboratory examination (without complaint or finding indicating need of observation or medical care)	2.4	2.1
Arteriosclerotic heart disease, including coronary disease	2.3	1.8
Laceration and open wound	2.1	1.9
Bronchitis unqualified	1.5	1.7
Asthma	1.5	0.8
Sprains and strains of joints and adjacent muscles	1.5	1.3
Anaemia of unspecified type	1.3	1.2
Well baby and child care	1.3	1.0
Diabetes mellitus	1.3	0.9
Otitis media and mastoiditis	1.3	1.8
Fractures	1.3	1.4
Superficial injury and contusion	1.2	1.3
Pneumonia	1.2	2.5
Obesity, not specified as of endocrine origin	1.1	0.5
Gastro-enteritis and colitis, except ulcerative, age 4 weeks and over	1.1	1.2
Ulcer of stomach and duodenum	1.1	0.4
Postpartum observation (without abnormal symptoms)	1.0	0.6
Menopausal symptoms	1.0	0.4
Pernicious and other hyperchronic anaemias	0.9	0.5
Acute bronchitis	0.9	1.0
Hay fever	0.9	0.03
Muscular rheumatism	0.9	1.1
Infective disease of uterus, vagina, and vulva	0.8	0.7
Disorders of menstruation	0.7	0.5
Synovitis, bursitis, and tenosynovitis	0.7	0.8
Cystitis	0.6	1.2
Measles	0.5	0.2
Vascular lesions affecting central nervous system	0.5	0.6
Diseases of teeth and supporting structures	0.5	1.3
Hernia of abdominal cavity	0.5	0.3
Burns	0.5	0.2
Arthritis, unspecified	0.5	0.5
Other categories	28.5	28.5

SOURCE: K. F. Clute, *The General Practitioner*, University of Toronto Press, Toronto, 1963, Table 60, p. 246.

TABLE 3.15
Number of Services per 1,000 Persons per Annum by Plan Experience:
Trans-Canada Medical Plans, 1965

Service or Procedure	BCMSI	MSA	MS(A)I	MMS	PSI	WMS	SSQ	QHSA	MHSA	MMC
<i>Surgical Operations</i>										
Appendectomy	1.22	2.14	3.24	2.52	3.12	2.28	2.67	2.30	2.76	3.63
Tonsils and adenoids	12.95	12.41	14.16	9.96	15.72	15.72	14.62	10.34	9.96	10.51
Hysterectomy	1.46	1.56	1.56	1.44	2.28	2.16	2.44	2.53	2.16	2.66
Herniotomy	4.70	3.46	3.72	3.72	4.20	4.44	2.99	2.80	2.88	2.56
Haemorrhoidectomy	1.41	1.36	1.32	1.20	1.44	1.80	1.73	1.97	1.32	.96
Cholecystectomy	2.61	1.63	2.28	2.04	2.04	2.40	3.67	3.00	2.40	2.04
Gastrectomy	.91	.62	.36	.48	.36	.72	.29	.44	.60	.49
Prostatectomy	3.02	.66	.84	.24	.84	1.20	.32	.32	.60	.20
Submucous resection	1.27	1.15	1.20	1.08	.96	.60	1.99	.56	.36	.43
Circumcision	5.50	7.37	6.96	7.20	8.40	9.96	3.12	1.18	4.68	4.46
Reduction of fracture	5.09	4.00	12.36	12.00	15.72	14.28	7.16	9.31	13.68	3.20
D and C	6.49	6.82	4.68	3.72	6.24	7.32	3.73	3.46	3.60	3.12
Oophorectomy	.60	.47	.96	included in other surgery		.12	12.37	.48	.12	.10
Phlebectomy	2.61	—	1.33		1.68	1.44	1.34	.85	.36	1.46
Thyroidectomy	.35	.34	.36	.36	.24	.36	—	.16	.36	.32
<i>Obstetrical Care</i>										
Vaginal delivery—complicated or uncomplicated	12.75	16.87	18.84	16.20	17.16	18.60	16.12	13.54	15.48	16.33
Caesarean section	.60	.91	.72	.48	.96	1.08	.72	.53	.84	1.01
Pre and postnatal calls (Report only if not paid as part of confinement cost.)	.85	—	1.80	—	15.36	149.04	—	1.80	—	7.27
Abortions and miscarriages	—	—	2.52	included in other surgery	2.28	7.20	2.86	2.14	1.80	3.53

MEDICAL CARE SECTION
Visits and consultations

Home calls (initial—day)	171.32	112.99	88.92	334.08	316.56	—	777.38 ¹	349.10	386.24
Subsequent calls (day)	137.66	62.08	45.12	184.56	—	—	—	—	244.63
Each additional member of family	24.41	20.71	20.04	—	34.68	28.08	—	—	53.85
Night, holiday or emergency calls	101.21	91.75	76.56	113.52	49.32	18.96	—	15.10	17.38
Office calls (initial)	1,384.32	1,144.24	1,287.60	1,608.48	2,871.36	2,853.84	—	1,477.20	1,351.14
Office calls (subsequent)	1,336.53	1,035.67	849.36	985.80	—	—	—	—	797.22
Hospital calls (initial)	1,010.84	566.80	67.44	722.64	872.76	877.80	629.95	781.	22.40
Hospital calls (repeat)	—	—	859.56	—	—	—	—	—	586.21
Consultations with associated procedures	168.42	130.87	17.28	67.56	186.84	5.52	—	46.30	91.08
Consultations without associated procedures	—	—	80.40	—	—	150.52	12.22	—	—
Annual medical	—	—	10.92	included with office calls	—	39.48	—	—	—
Well baby care	9.06	—	—	included with calls	74.76	57.60	—	—	31.32
Refractions	—	—	—	114.96	74.52	24.00	—	—	71.26
Psychotherapy (treatment)	63.44	41.77	42.60	—	87.48	13.20	—	—	.02
Shock treatment	6.33	3.37	5.88	12.60	9.36	4.20	—	5.52	3.84
<i>Other Related Services</i>									
X-ray (diagnostic)	299.42	240.98	303.60	277.80	192.48	198.04	63.42	45.36	2.73
X-ray (therapeutic)	24.22	14.05	6.36	.60	15.60	1.80	—	—	.75
Radium therapy	.35	.30	—	3.24	.12	.06	.61	—	.01
<i>Anaesthesia:</i>									
(a) Surgical	124.82	73.03	—	100.20	82.08	83.76	62.68	57.76	60.63
(b) Obstetrical	4.76	4.99	84.96	11.64	11.76	10.08	10.55	—	2.73
(c) Dental	5.76	7.01	—	—	4.08	1.68	—	—	—

¹Home and office calls combined.

SOURCE: *Annual Report, 1965*, Trans-Canada Medical Plans, Toronto, 1966, Table III.

TABLE 3.16

**Total and Percentage Breakdown of Current Expenditure on Selected Items of
Personal Health Services**

Country	Year		Total current expenditure (millions)	Payment to		
				Total (%)	University trained medical and dental (%)	Nursing personnel (%)
Complete returns						
Canada	1961	C\$	2,023 ¹	59.4	27.8	13.1
Ceylon	1957/58	Rp	201	51.4	—	—
Czechoslovakia	1961	Crs	6,533	36.7	9.9	15.3
Finland	1961	F. Mk	671 ¹	44.4	—	—
Netherlands	1963	G	2,160 ¹	—	—	—
Poland	1961	Zl	16,452 ³	40.1	—	—
United Kingdom	1961/62	£	1,003 ^{3, 4}	60.3 ⁴	16.1	15.2
U.S.A.	1961/62	U.S.\$	28,397 ¹	55.2	—	—
Yugoslavia	1961	Din	165,056 ¹	42.6	—	—
Incomplete returns						
Chile	1961	Esc	125	48.4	12.2	3.3
Federation of Rhodesia and Nyasaland	1960/61	£	7.64 ³	45.5 ²	8.6	13.6
Ivory Coast	1961	FCFA	2,396 ³	39.5	—	—
Philippines	1961/62	Peso	108 ³	56.7	—	—
Singapore	1961	M\$	49.0	59.7	—	—
Tanganyika	1961/62	£	2.07 ³	73.0 ²	11.9	18.5
Venezuela	1962	Bol	916	—	—	—
Sweden	1962	Kr	3,510	—	—	—

¹Includes depreciation.²Includes £40,000 (5.24%) for the Federation of Rhodesia and Nyasaland and £10,000 (3.38%) for Tanganyika representing "payments to other medical personnel".³Includes public health expenditure.⁴The total excludes £42 million that could not be allocated; the total for personnel includes 3.6% that could not be allocated between particular grades of staff, and the total for appliances and medicaments includes 7.2% that could not be allocated between these two categories.

Percentage breakdown of current expenditure							
personnel			Appliances and Medicaments			Other goods and services	
Para-medical staff (%)	Other staff (%)	Repay-ments or reimburse-ments of expenses (%)	Total (%)	Appliances (%)	Medica-ments (%)	Total (%)	Deprecia-tion and replace-ments (%)
3.0	15.5	— ⁷	19.2	1.5	17.7	21.4 ¹	1.9
—	—	—	25.9	—	—	22.7	—
8.8	2.0	0.7	27.2	1.8	25.4	36.1	—
—	—	—	21.8	—	—	33.8	1.2
—	—	—	14.5	3.0	11.5	—	0.1
—	—	—	38.9	—	38.9	21.0	—
7.6	16.0	1.8	19.7 ⁴	3.8	8.7	20.0	—
—	—	—	—	—	—	44.8 ⁶	—
—	—	—	17.6	0.8	16.8	39.8 ¹	4.3
15.5	17.4	—	6.7	1.5	5.2	44.9	—
7.6	9.7	0.8	24.4	0.3	24.1	30.1	—
—	—	—	26.6	7.7	19.0	35.9	—
—	—	—	31.3	1.8	29.6	12.0	—
—	—	2.9	5.2	—	—	35.2	—
2.8	32.6	3.9	9.4	—	—	17.6	—
—	—	—	—	—	26.4	—	—
—	—	—	13.9	—	13.9	—	—

⁵Breakdown only available for central government expenditures.

⁶Includes expenditure on other goods and services together with depreciation allowances.

⁷Included in "other goods and services".

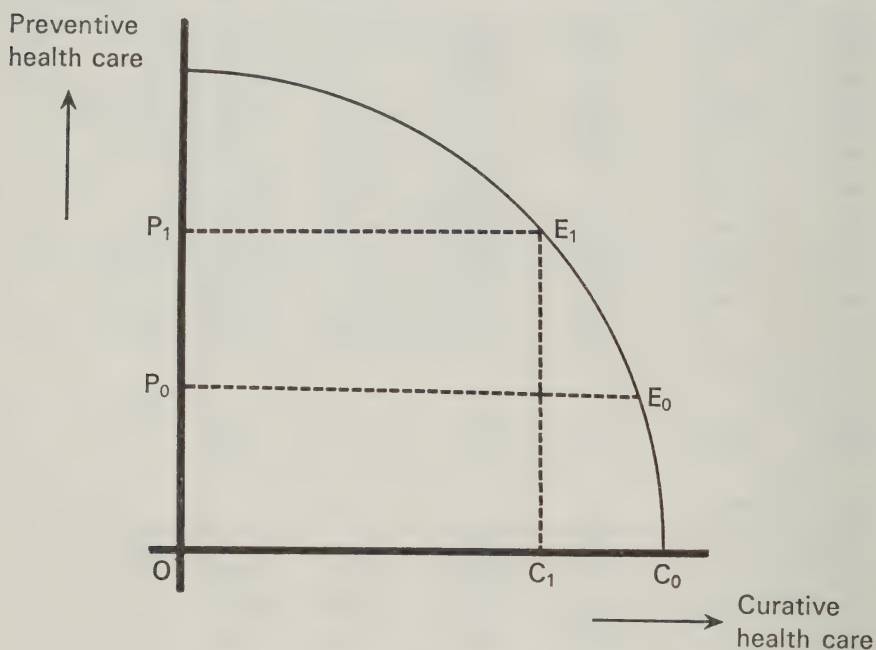
SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers, No. 32, World Health Organization, Geneva, 1967, pp. 64-65.

Evidence on the vast range of possible mixtures of different types of ambulatory care is abundant.

In any economy a choice between preventive and curative health goods and services must be, and implicitly is, made. We have conceptualized this choice in Figure 3.2. It would seem that in Canada we are presently operating at some point such as E_0 in Figure 3.2, with the majority of our health care resources being devoted to the provision of curative care.

Rough estimates of the value of preventive services supplied in Ontario and the other provinces annually over the period from 1954 to 1962 are presented in Table 3.17.

Figure 3.2. Production possibilities: preventive versus curative health care



The range of preventive services that we could but do not provide is vast. A very small percentage of Ontario (and Canadian) communities has adequately fluoridated (naturally or otherwise) water supplies; possibilities for universal immunization and vaccination are widespread; the virtual absence of adequate measures to control air and water pollution represents a tremendous gap in the provision of preventive health care. Finally, although annual medical check-ups may not be wholly preventive in nature, they, like periodic tuberculosis checks, cancer checks, and so on, could be provided to a much larger percentage of the population.

TABLE 3.17

Net General Expenditure on Sanitation and Waste Removal by Municipalities per 1,000 Persons, Deflated by "Government Expenditures on Goods and Services" Implicit Price Index (1949=100.00)

Prov.	1954	1955	1956	1957	1958	1959	1960	1961	1962
Nfld.	828	765	1,315	1,440	849	1,314	1,707	2,545	1,385
P.E.I.	45	82	142	189	762	2,605	2,672	936	684
N.S.	1,555	1,145	1,679	1,585	1,652	3,038	2,376	2,302	1,999
N.B.	949	688	1,306	940	1,617	1,193	1,060	1,483	1,290
Que.	1,430	1,237	1,149	1,151	1,222	1,254	1,138	1,351	1,404
Ont.	13,779	8,091	9,557	7,610	7,833	8,279	10,653	9,464	9,464
Man.	2,682	2,463	2,622	3,406	2,597	3,811	3,371	3,920	4,454
Sask.	3,057	3,499	5,108	4,749	5,008	4,827	4,345	4,566	5,458
Alta.	10,536	10,131	9,939	10,877	7,998	7,812	4,490	6,236	6,605
B.C.	3,666	3,980	3,718	5,294	4,417	5,666	8,329	9,216	9,604

SOURCE: DBS, *Historical Review of Financial Statistics of Governments in Canada*, Queen's Printer, Ottawa, 1962; and *National Accounts* (for implicit price indexes), 1959 and 1962.

The extent to which a society provides preventive services is usually a function of the degree of government activity in the health sector; for many preventive health services are characterized by large-scale externalities (such as the clearing of a malaria swamp — but see Chapter 5). In addition, health insurance plans are sometimes so designed that physicians are reimbursed for curative measures only. Thus, a physician would not be motivated to take preventive measures which might have been taken when he was able to charge for them either directly or through an inflated price for curative care. It is perhaps also arguable that individuals left to their own devices would bias their purchases of care towards the curative rather than the preventive ("When healthy, why see a doctor?").

Some indication of the volume of preventive care provided in different countries is presented in Table 3.18. Current expenditure on non-personal public health services is seen to vary from a low of .02 per cent of national income in the U.S.A. to .47 per cent in the Ivory Coast. The figure of .07 per cent found in Canada is lower than that found in twenty-one of the other twenty-four countries considered.

Further information on the relative size of preventive care in the total bundle of health goods and services is found in Table 3.10, p. 42. Current expenditures on non-personal public health services as a percentage of total expenditures range from a low of .3 per cent in the U.S.A. to a high of 8.3 per cent in Kenya. With 1.0 per cent of total expenditures allocated to non-personal public health services, Canada has the second lowest allocation of the sixteen countries listed.

Another classification of choices is that of research versus non-research uses of health care resources. Such resources may be used almost entirely in research acti-

TABLE 3.18
Current Expenditure on Non-personal Public Health Services as a Percentage of National Income

Country	Year	Current Expenditure on Non-personal Public Health Services (millions)		Current Expenditure on Non-personal Public Health Services as % National Income	Per Capita National Income, 1961 (US\$)
U.S.A. ¹	1961/62	US\$	94.5	0.02	2,306
Canada	1961	C\$	20.7	0.07	1,475
Sweden	1962	Kr	44	0.07 ²	1,420 ²
Australia	1960/61	A £	6.59	0.11	1,236
United Kingdom	1961/62	£	20.3	0.09	1,172
France ¹	1963	Fr	279	0.11	1,079
Israel	1961/62	I £	5.3	0.12	1,042
Czechoslovakia	1961	Crs	174	0.10 ²	920 ²
Finland	1961	F Mk	17.5	0.14	891
Netherlands ¹	1963	G	55.5	0.13	885
Poland	1961	Zl	473	0.11 ²	
Chile	1961	Esc	7.46	0.17	541
Cyprus	1961	£	0.13	0.13	485
Jamaica	1961	£	0.09	0.41	372
Costa Rica	1961	Col	3.1	0.13	300
Yugoslavia	1961	Din	6,574	0.20	233
Iran	1961	Rials	660	0.24	173
Ivory Coast	1961	FCFA	572	0.47 ²	154 ²
Senegal	1961	FCFA	428.6	0.36	153
Federation of Rhodesia and Nyasaland	1960/61	£	0.3	0.07	130
Ceylon	1957/58	Rps	9.6	0.19	120
Philippines	1961/62	Peso	16.44	0.13	120
Kenya	1961/62	£	0.7	0.32 ²	72 ²
Pakistan	1961/62	Rps	46	0.14	74
Tanganyika	1961/62	£	0.23	0.12	54

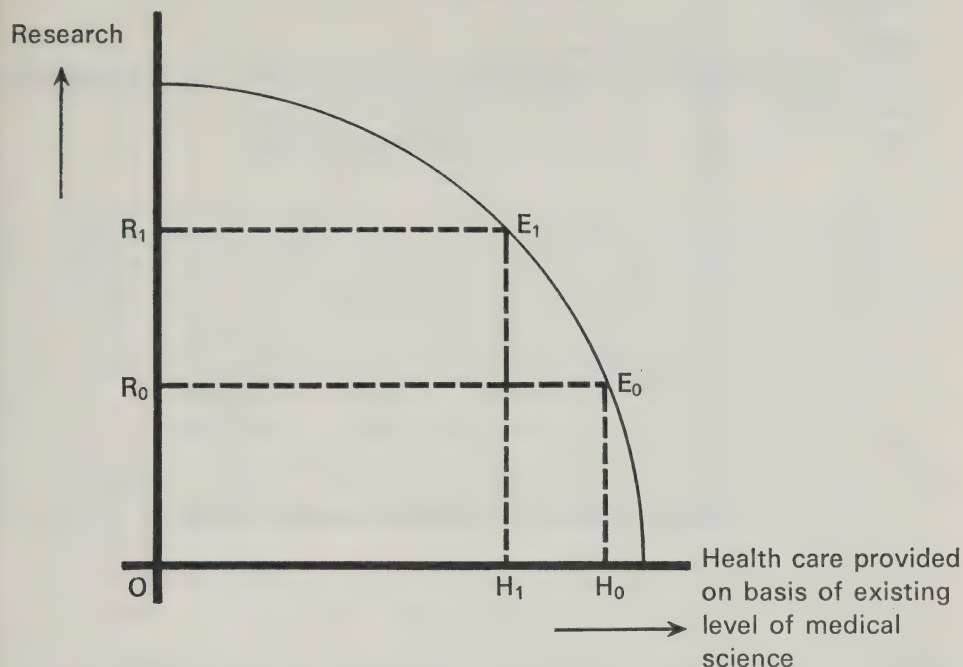
¹Including depreciation.

²Estimated from a related aggregate.

SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers, No. 32, World Health Organization, Geneva, 1967, p. 60.

vities, or they may be used in the provision of health care with the existing state of medical science. This range of choices is illustrated in Figure 3.3. Once again, our society may well be operating at some point E_0 , with virtually all our resources allocated to the provision of health care with the existing state of medical knowledge and very few resources employed in medical research. (This is not to deny, of course, that a great deal of the health care provided in modern hospitals has a large research component.)

Again, research expenditures are characterized by tremendous externalities, and thus there is probably a close relationship between the percentage of resources of the health sector devoted to research and the degree of government activity in the provision of health care.

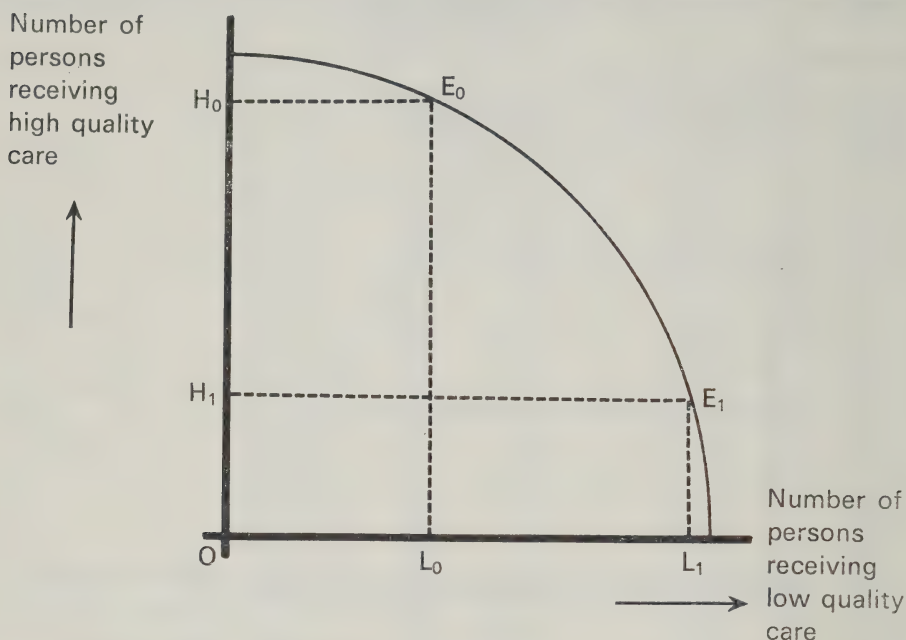
Figure 3.3. Production possibilities: research versus use of the existing state of medical science

Some indication of mix of research expenditures and expenditures on health goods and services can be seen in Table 3.10, p. 42. We note that expenditures on teaching and research together as a percentage of total current expenditures on health services varies from a low of .8 per cent in Tanganyika to a high of 6.3 per cent in Czechoslovakia. The figure of 1.8 found in Canada is again relatively low, in fact lower than that found in nine of the other fourteen countries considered.

We have already touched on the geographic distribution of health care.⁷ This involves consideration of the urban-rural distributions, the regional distribution, and the demographic distribution of health goods and services. Use of data on the distribution of resources to indicate the distribution of health goods and services is subject, however, to qualification. In the same way as rural and semi-rural inhabitants travel to urban shopping centres, so also they probably travel some distance to seek hospital and medical care. They may do this not so much because hospitals and physicians are not located in their immediate vicinity, but because the hospitals and physicians located in the urban centres are thought to be of a higher quality than the local ones.

Related to the geographic distribution of health goods and services is the distribution of care by age, by social class, by income class, and by disease group.

⁷See the data on the distribution of health care resources presented in Chapter 2.

Figure 3.4. Production possibilities: quantity of care versus quality of care

Each of these distributions of health care represents a set of choices that is made, either explicitly or implicitly, in a society.⁸

The last broad set of choices that we consider is that of quality versus quantity of care. This set of choices is illustrated in Figure 3.4. It seems probable that our society is presently at some position such as E_0 , with large sections of the population receiving little or no care.

It is a very important set of choices, because it usually represents in practice the choice between providing high quality care to the upper income education and social classes, and providing low quality or no care to the low income classes. Given the stock of health care resources, it is meaningless to talk about providing all persons with the highest quality of health care. By definition, this is not possible. Since health care resources are limited and thus scarce, it is necessary to choose between quality and quantity. That large sections of the population of our society presently receive little or no care at all is suggested by the distributional data presented in the previous chapter and in Chapter 6. The recently published study⁹ of the quality of general practice in Ontario and Nova Scotia supplies a great deal of information about the quality (or lack of quality) of medical care provided in areas that actually have physicians.

⁸More detailed data on the actual distribution of care are found in Chapter 6.

⁹K. F. Clute, *op. cit.*

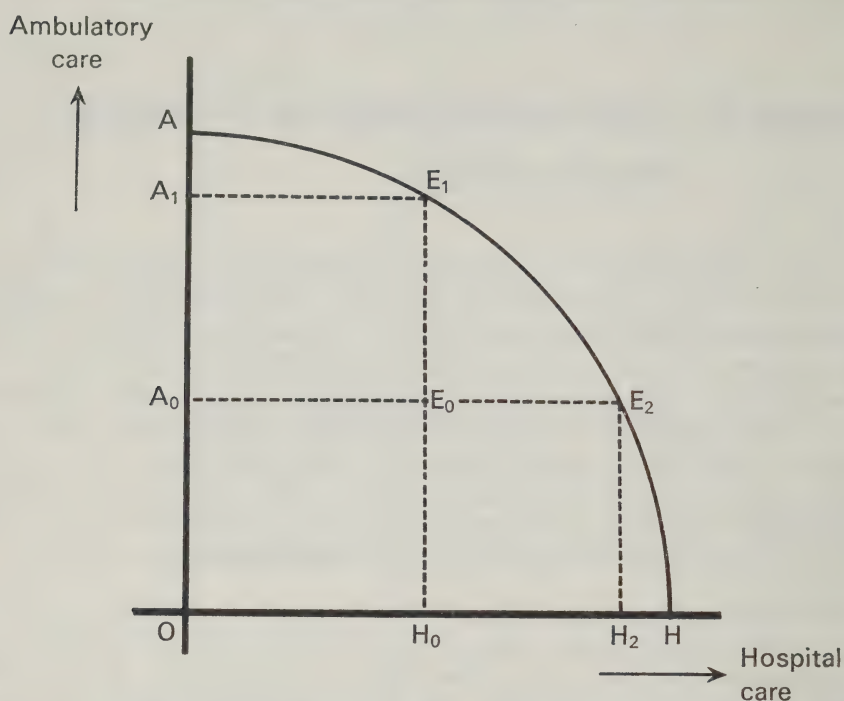
Chapter 4 Alternative Ways of Providing Health Care

The third principal element of the economic problem of providing health care is the presence of alternative methods of combining scarce health care resources to produce particular health goods and services. In Chapter 2 we outlined the problem of the scarcity of resources in the health sector. In Chapter 3 we investigated the various goods and services that our limited resources are, or could be, providing. Now, in this chapter, we emphasize the processes through which health care resources are combined to provide health care and the influence of the economic structure on the particular processes chosen in a given community. Accordingly, we ask what is the effect of the economic structure on the processes by which health care resources are combined to produce a given health good or service.

If we desire a higher level of health care, three broad alternative approaches can be followed. First, we can simply allocate more resources to the health sector by diverting resources from other sectors of the economy. Second, we can organize the existing health care resources in a different fashion in such a way as to increase the level of health goods and services that they provide, unless they are presently organized in the most efficient manner. Third, we can, of course, adopt some combination of these alternatives. If resources are not efficiently employed in the health sector, then in our world of scarce resources the second alternative is preferable to the first.

The problem we outline here is analogous to that of producing automobiles. More cars can be produced by employing more men or equipment, by rearranging the existing labour force on the assembly line in a more efficient manner, or by doing both. Increasing the level of employment clearly increases total real costs, but reorganizing an inefficiently operated assembly line may well add more to profits than the costs of reorganization. In Figure 4.1, we illustrate the implications of alternative ways of providing health care.

Our entire study concentrates on the second approach: namely, whether a reshaping of the economic structure of the health sector would lead to an increase in the quantity or quality of health care. Accordingly, our task in this chapter is to examine alternative ways of combining health care resources as attempted by Ontario, by other parts of Canada, and by other countries. In so doing, we emphasize the relationship between the economic structure of the health sector and the choice of particular methods of providing care.

Figure 4.1. Alternative ways of providing health care

If a society is operating at a point such as E_0 , either health care resources are not being fully utilized, or they are being utilized inefficiently. For example, hospital wards equipped to care for seriously ill heart cases are being used to bed patients who require some simple diagnostic procedure; or physicians with seven years of medical education are weighing patients, checking their eyesight, and so on.

To the extent that resources are not being used efficiently, it is possible to adopt more efficient procedures and to provide more ambulatory care without reducing the provision of hospital care (at point E_1), or more hospital care without reducing the amount of ambulatory care provided (at point E_2); or to produce more of both ambulatory and hospital care (at any point within the triangle E_0, E_1, E_2). In short, given the production-possibility curve AH , provision of a combination of ambulatory and hospital care represented by any point on the curve AH implies that the most efficient methods of providing health care are in fact being used; any point in the triangle OAH implies that inefficient methods of providing health care are being used.

In this framework, it is useful to consider alternative methods of organizing health care resources in the following three ways, each of which emphasizes a different element of the economic structure of the health sector:¹

¹Recall that the three major aspects or elements of the economic structure of the health sector are the general system of resource allocation, the institutional framework of licensing procedures and associated educational requirements, and the traditional practices and characteristics of the health sector.

- 1) Given the existing institutional framework of licensing procedures with accompanying educational requirements and given traditional practices, there are alternative general systems of organizing health care resources (market allocation versus government allocation); and under different general systems of resource allocation, there will be a range of alternative methods of combining health care resources to provide health goods and services. The particular general system of resource allocation, however, is likely to be associated with particular patterns of providing care.
- 2) Given the general system of organizing health care resources and given the existing institutional framework of licensing procedures, regulations and accompanying educational requirements, there are different patterns of traditional practices in different countries; each such set of traditional practices allows for some flexibility in the ways in which health care resources can be combined to provide particular health goods and services.
- 3) Given the general system of organizing health care resources and given certain traditional practices in the health sector, there are alternative institutional frameworks with licensing procedures, regulations and accompanying educational requirements; each such alternative institutional framework implies a range of alternative methods of combining health care resources to provide particular health care goods and services; but some such institutional frameworks may restrict severely the range of alternative methods of providing health care from which the individual or society can choose.

Although in this study we are more interested in the relationship between the institutional framework of licensing procedures and possible ways of providing health care, we also want to describe the overall economic structure of the health sector. Thus we shall elaborate on each of these three ways of looking at the range of alternative processes of combining health care resources to provide health care, and shall thereby emphasize the relationship of the economic structure and its three major aspects to these processes.

General Systems of Resource Allocation

In the following brief discussion we attempt to hold conceptually constant the institutional framework of licensing procedures, regulations and accompanying educational requirements, and also the set of traditional practices that characterizes the health sector. We then ask, "Are there particular ways of combining health care resources to provide given health goods and services that are more commonly associated with a particular general system² of resource allocation than with another system?"

²For our purposes in this section, we consider only the broad allocation systems of the market-price system and centralized government operation.

There appear to be three main ways in which the general system of resource allocation can affect the range of alternative processes available: it may affect the use of capital equipment, the use of human health care resources, and the use of intermediate products, such as drugs.

An imperfect capital market could lead to labour-intensive operations in a market system and capital-intensive operations in a government operation. Indeed, the market-price system would probably use a large amount of home and family care as a substitute for hospital and nursing care, respectively. Of course, just the reverse could be the case. If the market-price system is constrained by a powerful association of medical personnel, there might well be a greater use (that is, under-use) of capital equipment than would be the case with government operation.

Second, use of human resources may differ under different systems. It is arguable that large-scale use of the free market-price system will lead to a near optimal mix of human health care resources, while government operation will not. On the other hand, with less than the complete use of the free market-price system—that is given the presence, for example, of a monopolistic association of medical personnel—the presence of an equally powerful buyer of health, namely the government, might well improve the efficiency of the processes through which health care is provided; for the buyer will insist that job functions previously performed by a relatively inefficient resource are performed more efficiently.

Roughly the same argument³ might be made about the use of brand-name, relatively expensive drugs. Under a market-price system constrained by the presence of monopolistic drug producers, the use of drugs as a process of providing health care might be less than optimal. If the geographically widely dispersed purchasers of drugs were replaced by a powerful single buyer, namely the government, the use of drugs might well increase as drug manufacturers were forced to lower drug prices.

What is clear in these cases is that there are many different processes by which health care can be provided. Medical personnel can work alone with very little capital equipment, doing a wide variety of job functions; or they can work as part of a medical care team, complete with personnel doing specialized tasks in a capital-intensive group practice, public health clinic or hospital outpatient department. In addition, they may use low-priced drugs a great deal or high-priced drugs a little in providing care.

What is not so clear, however, is the effect of the general system of resource allocation on the particular ways of providing care actually adopted in the community.

³This may be referred to as the bilateral monopoly case.

Traditional Practices in the Health Sector

In this subsection we want to hold conceptually constant the general system of resource allocation and the institutional framework of licensing procedures and accompanying educational requirements. We then ask, "What, if any, is the influence of traditional practices in the health sector on the processes through which health care resources are combined to produce a given health good or service?"

Again, the effect of this aspect of the economic structure of the health sector on the processes of providing health care may be classified in terms of its effect on the use of capital equipment, on the type of personnel used, and on the use of intermediate products.

The presence of religious and other charitable organizations characterizes the health sector of many areas. It seems probable that health care provided in institutions operated by such bodies on average involves a much larger application of human health care resources relative to non-human resources than would be the case in other institutions. This seems to follow if the health care personnel in such institutions work there primarily for reasons other than income. In addition, an imperfect capital market might make it easier to employ human personnel than to build a new or larger hospital.

A second traditional practice found in the health sector of some countries is the use of the fee-for-service schedule. Rather than charge a patient on an annual basis, for example, for the provision of health care during the year, the physician charges a fee for each service performed. In addition, there is said to be pressure on each physician to use the same schedule.

An evaluation of a given fee-for-service schedule in relation to information on the real costs of performing the various services would probably lead to unambiguous predictions of which health services would be subject to overprovision and which to underprovision. Predictions about the effect of the fee-for-service schedule on the ways in which a given health good is provided are somewhat more difficult to make. However, at least two hypotheses can be proposed. First, use of fee-for-service pricing should lead to a greater use of physician's services than drugs, for example, or hospital care than would be the case if the physician were being paid on a salaried basis. Second, one would expect there to be less referral among physicians and thus less specialization under a fee-for-service pricing system than would be the case if physicians were paid on a salaried basis.

Closely associated with, and perhaps a direct result of, the fee-for-service schedule is solo practice. It must rank as a major form of organization of the process of providing health care in North America. As such, it probably has much the same effects on the processes of providing care as does the fee-for-service schedule: that is, the physician, in most cases a general practitioner, renders a

wide variety of health goods and services (for the performance of which he is sometimes undertrained and at other times overtrained),⁴ for some of which referrals to specialists or use of drugs might be substituted in the interests of the efficient provision of health care.

Solo practice has many other effects on the processes through which health care resources are combined to produce a given health good or service. We deal with these in detail in Chapter 6. For the present, we describe briefly the use of another form of organizing the processes of providing personal health care, "group practice", in two North American centres.

The Kaiser Foundation Medical Care Program

One of the most successful and largest health care organizations in the United States is that of the Kaiser Foundation, which revolves around group practice. The program started by serving the medical needs of workmen on remote construction projects during the 1930's. It was later organized for workers in the wartime shipyards and steel mills. The program became community-wide in 1945. In 1965, it served more than 1,300,000 subscribers and dependents in communities in the Pacific Coast States and Hawaii. Of this number, only about 4 per cent were Kaiser industrial employees.

Under this program, prepaid health care services are provided to subscribing members on a self-sustaining and non-profit basis. A series of hospitals are maintained by the program. Members must utilize these to obtain hospitalization benefits.

Our main interest is in the Permanente Medical Groups that practise at forty-four medical facilities, fifteen of which are part of Kaiser Foundation Hospitals. Physicians are considered the critical resource in the program and are responsible for the quality of care. They work regular, scheduled hours with time reserved for continuing education, research and personal affairs. Plan members are encouraged to select a personal physician on the staff and to look to him for guidance in all aspects of health care and for referral to other specialists when necessary. Staff members are organized by departments of the major specialties, and both physicians and paramedical personnel concentrate their time and effort on their own field of patient care, free from non-professional tasks. Each Permanente Group's responsibility extends to providing continuity of care and assuming a continuing obligation to each health plan member for health maintenance and prevention of disease.

The program especially emphasizes preventive medicine and hence periodic medical examinations for all its members. It was decided that in order to examine large numbers of people at reasonable cost, an efficient process for conducting

⁴See K. F. Clute, *op. cit.*

check-ups had to be used. To this end, an automated multi-test laboratory was established, in which automated, electronic computer equipment forms an integral part of a routine period health examination for 4,000 patients a month. Several radiological and chemical tests, as well as measurements and a medical history prepared by the patient on prepunched cards, are analyzed simultaneously, and a summary report is printed out by the computer for the examining physician.

Since premiums relate to the use of covered services in a group of members, the group's prepayment rate and benefit structure may vary from year to year. Unlike fee-for-service programs, each Permanente Group receives a negotiated monthly amount per health plan member, regardless of the amount of services rendered, so that incomes are stable and both consumer and producer share an economic and medical identity of interest in health maintenance.

Prepayment arrangements encourage early visits and consultation. This, along with the coverage of nursing home care and comprehensive service within the medical clinics, results in lower hospital utilization. Admissions to hospital decreased 24 per cent from 1960 to 1964. Hospital days per admission declined from 6.33 in 1960 to 6.22 in 1964. During the same period there was a 60 per cent increase in membership. Thus, the Kaiser program seems to offer a framework for realizing a more optimal organization of health care resources, while at the same time striving to preserve a high level of personalized care and close relationships between physician and patient.

The Sault Ste. Marie Group Health Centre

In 1963, the Sault Ste. Marie Group Health Centre opened its doors amid considerable controversy with the local medical profession. A lay, non-profit corporation had been sponsored by the Steelworkers Union local, along with community representation, to build and operate the medical facility for group medical practice. After nearly four years, this program has gained wide recognition as a high quality medical care institution in which modern group practice of medicine is combined with prepayment of the costs of care, along with consumer participation in the provision of health care facilities.

The Sault Ste. Marie Group Health Centre, like the Kaiser Program, demonstrated a remarkably significant reduction in hospital bed utilization as compared to the local population served in the traditional fashion. In 1964, for example, the number of admissions per thousand population, and the number of days of care per thousand population for the Group Health Centre were 95 and 680, as compared to 136 and 1,497 for the Sault Ste. Marie region at large. For the province of Ontario, the hospital days per thousand in that year were 1,717. The average length of stay was 7.7 days for the Group Health Association members, compared to 11.2 days for Sault Ste. Marie overall.

There is also a Group Health Centre being developed in St. Catharines. It is being established by a non-profit corporation under Ontario law. The initial spon-

sorship is by Local 199 of the United Automobile Workers Union, but the program is designed to expand into community-wide participation at both consumer and policy level. As a consumer-sponsored group practice prepayment plan, it will take on the traditions of the growing group health movement of North America. Both these group health centres have followed the American plans and the three Community Clinics in Saskatchewan.

Because the form of organization of the processes of providing personal health care seems to be so important in the health sector, we return to the question of group practice versus solo practice in Chapter 6.

The Institutional Framework of Licensing Procedures

In this final subsection of Chapter 4 we attempt to hold conceptually constant the general system of resource allocation and the traditional practices that characterize the health sector. We then ask, "Are there alternative institutional frameworks which would imply a new range of ways of providing health care?"

The answer to this question is, of course, "Yes." For it is the institutional framework of licensing procedures that directly determines the kinds of human health care resources that are available for providing health care. Of the many types of human health care resources that we could have but do not, we select for discussion the midwife, the feldscher, and the dental health nurse.

Feldschers, Midwives and Maternal and Child Health in Rural Areas of the U.S.S.R.

There are three categories of paramedical personnel in the U.S.S.R.: feldschers, midwives, and nurses. The feldschers are the highest category of paramedical help. Although their training tends basically to make them workers in preventive medicine, they obtain sufficient knowledge to carry out simple diagnosis and to give ordinary treatment in uncomplicated cases. They are, therefore, assistants to the physicians; they take on certain responsibilities but in theory work under the supervision of a fully qualified physician, whom they must consult within three days if any treatment begun is not giving satisfactory results. To date, the feldscher has been, above all, an auxiliary doctor, employed in a hospital or, in most cases, occupying a medical post in a rural area together with a midwife (feldscher-midwife post). Although the number of physicians is continually increasing and is expected to be sufficient to meet all requirements in the near future, the training of feldschers is expected to continue. They will then form a category of highly qualified male or female nurses.

The midwives deal with births in hospitals and maternity homes and give prenatal care. This includes the training for painless childbirth, which is carried out in the women's advisory clinics in the cities, or in the collective-farm medical posts in rural areas. In the rural areas on the collective or state farms, they also

supervise the health of children. The nurses are multi-purpose nurses, trained for hospital work as well as public health work.

Maternal and child health care in rural areas is organized at four levels: the rayon hospital, the district hospital, the collective-farm and State-farm maternity homes, and the mother's advisory clinics (most of these clinics are attached to the feldscher-midwife posts). The rayon hospital is a general hospital which includes an obstetrical and gynaecological unit. A district hospital is not located in every district, but there may be one or several secondary hospitals in a rayon. These hospitals include beds for pregnant women, labour beds and gynaecological beds.

The collective-farm maternity home forms the basis of the health care system in rural areas. The building is provided by the collective farm and its size depends on the size of the farm. At a minimum, it consists of a reception and waiting room, an examination room, a labour ward and three hospital beds (one prenatal bed and two beds for women who have already had their babies). The post is manned by a midwife and an auxiliary, whose job it is to run the prenatal clinic and undertake normal deliveries. Laboratory examinations are carried out in the rayon hospitals. The midwife's work is checked periodically by the obstetrician-gynaecologist in the district, upon whom she can call in case of need. The midwife also works with the collective-farm feldscher. In a case of abnormal pregnancy, the pregnant woman is sent to the district or rayon hospital, either in a hospital ambulance or in a collective-farm vehicle.

The number of births that take place in these maternity homes varies according to the size of the village. In any case, it is the midwife's duty to take an active part in the health education of the people. Three times a week she will run the school for mothers. She is responsible also for supervision of the health of babies up to one year of age.

The feldscher-midwife posts constitute the smallest working health units and are mostly situated on the collective farms.

All paramedical workers can improve their qualifications in various ways. There are refresher or further-training courses that the worker may take while holding a post, and these are open to every member of the working staff. Since the government is anxious that the staff should keep abreast of the latest developments in science, personnel are called upon to attend refresher courses, the length and frequency of which depend on their branch of activity. In practice, the length of these courses varies from two to six months, every three to six years. In some places the executive officials are given the task of organizing seminars or giving monthly lectures. Sometimes research workers from various institutes visit the establishment and organize these seminars.

A person who, after several years of practical experience, wishes to work in a different capacity can attend special training courses in various branches of health

care. Thus, nurses may become health visitors or specialize in electrocardiology, laboratory work in physiology, chemistry or radiology, dietetics or physiotherapy. Feldschers can specialize in environmental sanitation, diet, laboratory work and dental care. Finally, it is relatively easy for paramedical personnel to obtain admission to medical facilities and to obtain a diploma identical to that received by ordinary medical students.

Dental Health Nurses in New Zealand

The New Zealand State Dental Service was organized as a Division of the Department of Health in 1921. Since large costs and recruitment problems made impractical the training of many more dentists than the existing number, the occupation of the dental nurse was developed. The dental health nurse staffs school dental clinics and performs simple, remedial procedures.

The idea for such dental auxiliaries seems to have originated with the American dental hygienist (a training program launched in the United States in 1913). However, the responsibilities of the dental hygienist were extended considerably to include extractions and fillings as well as prophylaxis and dental health education.

Most of the school dental clinics of the State Dental Service are staffed by one nurse working alone. No assistant is provided, and it is reported that the nurse prefers to do her own clerical work (this, it is claimed, offers a pleasant respite from her actual dental operative work). A few clinics in the larger schools have two nurses on staff. There are none larger. Where necessary, in order to maintain the roster of 500 children per nurse, children may be required to travel from a neighbouring school to the school at which the clinic is set up. In rural areas, subclinics are established and the nurse moves back and forth between them.

The dental nurse works only during school hours, and the child is excused from class while undergoing treatment. The dental health nurse has no x-ray equipment; a mouth mirror is her only tool for inspection and determination of defect. She does extractions and fillings of both primary and permanent teeth, cleaning and other prophylaxis, including the application of topical fluorides and dental health education. If orthodontic work is needed, she makes the proper referral. Every so often, a dental officer gives on-the-spot inspection.

The training period for the dental nurse is two calendar years with eight weeks' vacation each year. About 10 per cent of the trainees take longer (two and a half to three years) to complete the course.

Since the New Zealand dental nurse has a comparatively low patient roster and has her work confined to simple routine and highly standardized procedures, she has plenty of time to play with the children and gain their confidence. In fact, her ability to get along with children is considered to be as important a qualification as her technical competence. Thus, it is claimed, one of the chief accomplishments of the New Zealand School Dental Service is that it produces at age twelve

or fourteen a child who has not only a healthy mouth, but also a good attitude towards dentists and dental care.

In a survey in 1950, a random sampling revealed that there was very little difference between rural and urban areas in terms of acceptance of the service. (In seven urban clinics sampled, 79.4 per cent of the eligible children were registered with the service; in twelve rural clinics sampled, 85.1 per cent of the eligible children were registered with the service.) Incidentally, the School Dental Service, rather than decreasing the demand for dentists, seems to have increased it.

Many countries in Southeast Asia, notably Malaya, the Philippines and Ceylon, are emulating New Zealand in the training and utilization of dental nurses. An innovation in Malaya requires these dental nurses to work under the direct supervision of a qualified dentist (as compared with indirect supervision in New Zealand). Thus the Malayan dental nurse would seem to be a cross between the American hygienist and the New Zealand dental nurse.

Conclusion

Health care resources are scarce, and there are a multitude of health goods and services that we desire. We have seen that there are alternative ways of organizing these resources, alternative institutional frameworks within which health resources can operate, and alternative methods of combining the scarce resources within the given system and institutions. This chapter has been a partial outline of the choices that are open to us. In Chapter 5 we shall discuss the criteria for such choices.

Chapter 5 Economic Structure and Optimal Allocation of Resources

In Chapters 2, 3 and 4, we have considered the three major aspects of the economic problem of providing health care, and also, briefly, the relationship of the economic structure to these three aspects. We now proceed to examine the relationship between economic structure and optimal resource allocation. First, we set out the conditions for optimal resource allocation. We then examine the relationship between these conditions and the economic structure of the health sector, considering in turn the general system of resource allocation, the institutional framework of licensing procedures, and traditional practices that characterize the health sector. In this chapter we concentrate on the general system of resource allocation, and deal with the remaining two aspects in the following chapters.

Conditions for Optimal Resource Allocation

A discussion of optimal resource allocation necessarily involves a discussion of specialization and division of labour, for optimal resource allocation is nothing more than optimal division of labour. The advantages of specialization¹ and division of labour result from three characteristics: first, from “the increase of dexterity in every particular workman”; second, from “the saving of the time which is commonly lost in passing from one species of work to another”; and, third, from “the invention of a great number of machines which facilitate and abridge labour and enable one man to do the work of many”.²

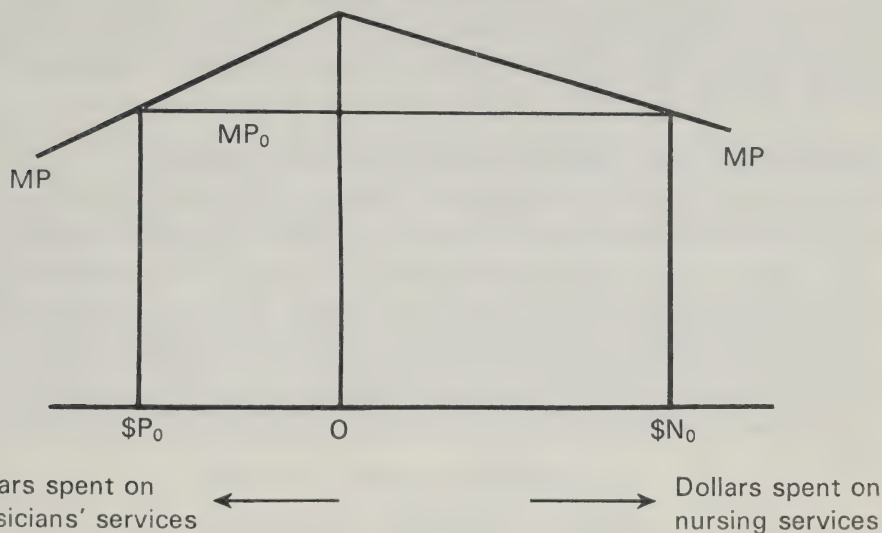
The economic structure of the health sector can be said to provide an optimal allocation of resources — that is, an optimal level of specialization and division of labour — if the health sector is characterized by the condition that the last dollar spent by individuals or by society on the services of a particular health care resource yields a service (marginal product) that is equal in value to the service (marginal product) resulting from the last dollar spent on each and every other health care resource. This condition is illustrated in Figure 5.1.

The condition for efficient resource use, then, is that resources (human and non-human) be employed up to the stage at which the last dollar spent on each

¹It is very easy to demonstrate the gains from specialization and division of labour even in the case of two individuals, one of whom can do all tasks more efficiently than the other. Similarly, economic gains can be derived from trade between a developed and an under-developed country, for example.

²Adam Smith, *op. cit.*, p. 7.

Figure 5.1. Criteria for evaluating the nature and structural organization of health care resources



It can be easily demonstrated that any other allocation of expenditures would be sub-optimal; that is, that a readjustment of expenditures would increase the total volume of services (total product) rendered by the expenditure of given resources.

yields the same increase in total product. If this is not the case, then given resources can be reorganized to produce a larger basket of health goods and services; or the given basket of health goods and services can be produced by a smaller bundle of health care resources.

In an analysis of the structural organization of health care resources, therefore, three questions must be kept constantly in mind: "Are there opportunities for the allocation of one set of tasks to one type of personnel and another set of tasks to another type of personnel, so that both types are permitted to specialize?"; "Is there an unnecessary amount of time being used by highly skilled personnel in travelling from one place of work to another?"; and "Are human and non-human resources being combined effectively?"

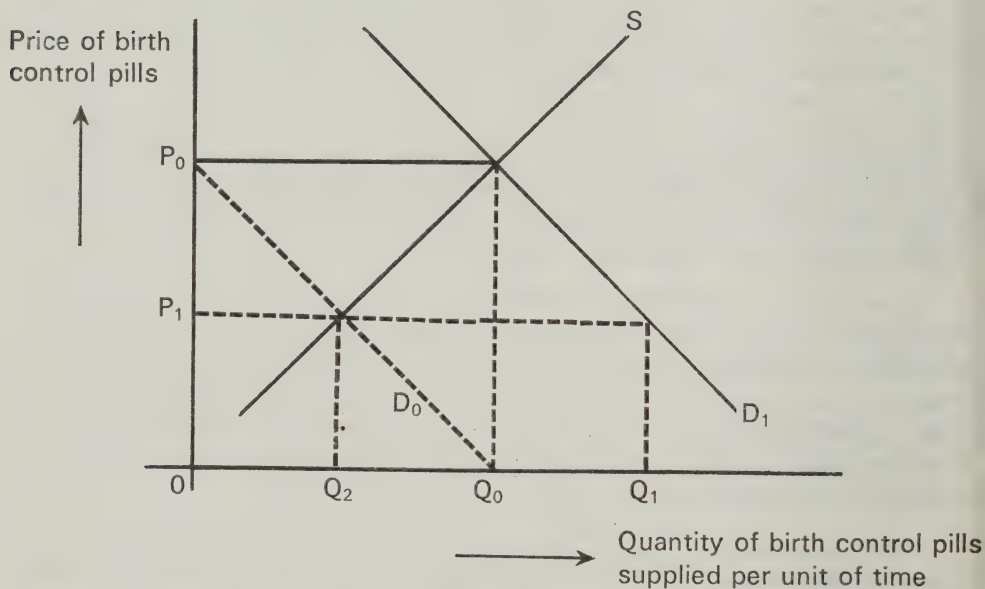
Note that specialization is not pursued without limit; that is, there is no economic justification for specialization for its own sake. In a free market-price system the limit of specialization is provided by the "extent of the market". If the reward to an individual who foregoes present income in order to specialize is less than the increase in the present value of his income stream as a result of specializing, it will not be in the interests of society that he specialize. Further, we can assume that, because it is not in the individual's interest to specialize, he will not proceed to specialize at that particular point in time.

Accordingly, we must pose a fourth and related question: "Has specialization been too little or carried too far?"; more important, "Are there aspects of the present structural organization of health care resources which promote or offer incentives to individuals for specialization, beyond what is in the interests of society and also beyond what would be in the interests of the individual if there were a different system of allocating resources?"

Optimal Resource Allocation and the Price System

The price system traditionally has been the principal system for allocating resources both within the health sector itself and also within the general economy. This reliance on the price system probably stems from the ability of prices to serve as an excellent rationing device of private goods and factors of production. In this aspect, the price system solves the economic problem described in Chapters 2, 3 and 4. In addition, if there are many buyers of the health service and many suppliers of the service, the equilibrium market price can be associated with the maximization of welfare on the part of the consumers and producers of the health service.

Figure 5.2. Shortage in the short run



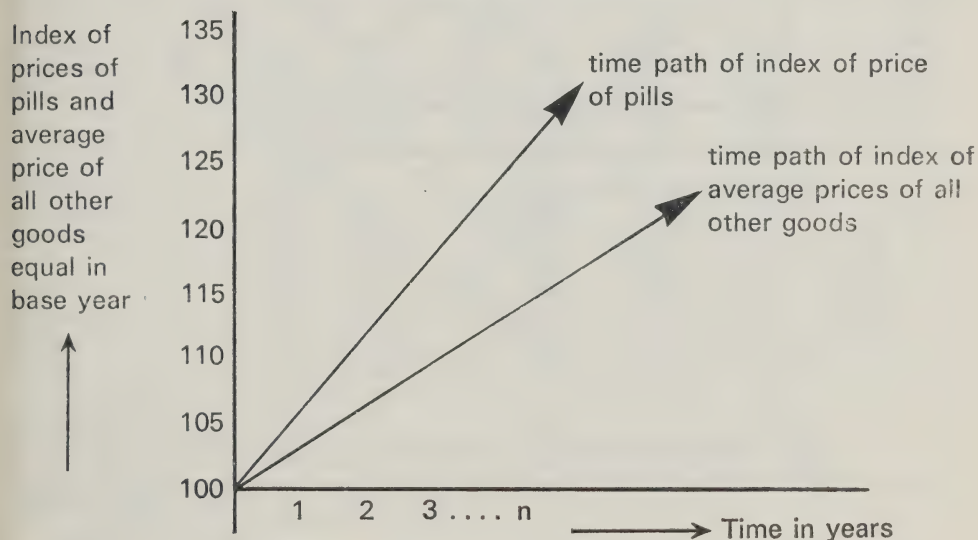
With demand, D_1 , equilibrium price for these pills would be P_0 and the quantity, Q_0 , would be produced. If some price lower than P_0 , say P_1 (which might have been the old equilibrium price with demand D_0), is found to exist in the market, then there will be excess demand of Q_1 the quantity of pills demanded at P_1 , minus Q_2 , the quantity of pills supplied at the price P_1 . This excess demand represents the shortage of pills.

The use of the price system as a rationer of goods and factor services can be illustrated by a discussion of shortage and the reaction of price to shortage.

In the short-run (static) situation, one operationally meaningful way to define shortage is in terms of excess demand. This is illustrated in Figure 5.2. How then does one tell if there is excess or shortage in any market? *There is a shortage if price is rising.* If there is no shortage, then there is no pressure on equilibrium price. If there is shortage, then there is pressure to increase price; those wanting to buy, for example, birth control pills bid up the price in an attempt to draw greater supplies on to the market. Given the conditions of demand and supply, this upward pressure on prices will stop only after price has risen to the equilibrium price.

Shortage in the long-run (dynamic) situation is more difficult to define and measure. If the price of birth control pills is rising more rapidly than the prices of other goods, then there is the suggestion that a shortage of pills exists. Shortage in this long-run, dynamic sense is illustrated in Figure 5.3.

Figure 5.3. Shortage in the long run



Shortage so described can result if the demand for birth control pills increases much more rapidly, relative to the ability of producers to increase supply, than demand for other goods relative to their supply. (See Figure 5.4.)

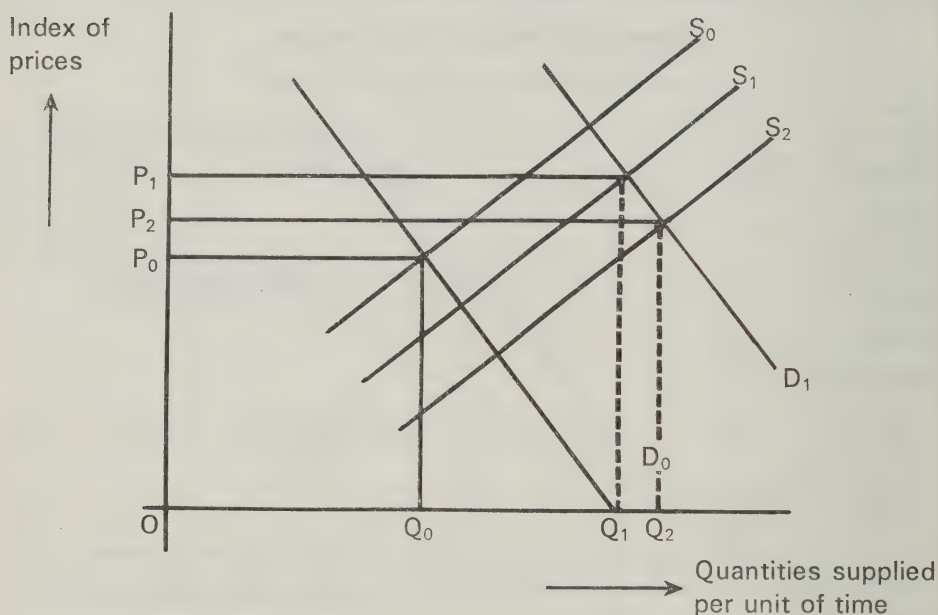
There is some support for the contention that supply conditions for physicians and surgeons, and especially for dentists, are relatively unresponsive to changes in income (which, we assume, reflect changes in demand) for the period 1961 to 1965 in Ontario. For a number of reasons, observations using these data must be

interpreted with caution. The data refer to taxable income and taxpayers only; we are not able to determine when the change in demand took place (even with completely unrestricted entry into medical and dental schools, there is the time lag of the number of years required to become a physician or dentist), and we do not have data on the effect of migration on the number of personnel.

There are several possible combinations of changes in demand and supply for various goods that would lead to differential price changes. Therefore it is difficult to determine whether an observed pattern of differential price changes reflects larger-than-average shifts in demand, or supply conditions which are relatively unresponsive to changes in demand.

It is instructive, nevertheless, to look at some of the data describing changes in income and changes in the number of taxpayers for physicians and surgeons and dentists, and to compare these data with those describing similar changes for

Figure 5.4. Shortage in the long run: an example



Demand for pills is assumed to increase from D_0 to D_1 and supply to increase subsequently from S_0 to S_1 . This raises equilibrium price from P_0 to P_1 . On the assumption that the demand for all other goods increases on average by the same proportion and that this increase can be represented also by the shift of D_0 to D_1 , and on the further supposition that the supply of other goods increases proportionately more on average than the supply of pills from S_0 to S_2 , the new equilibrium average price for other goods will be less than P_1 . Therefore, the rate of increase in price will be less for all other goods on average than for pills. This process of differential price changes thus reflects the nature of supply conditions.

TABLE 5.1

Changes in Taxable Income and Number of Taxpayers for Selected Occupational Groups, Canada and Ontario, 1951-1961 and 1961-1965

Occupation		1951	1961	Amt. of change	% Change	1961	1965	Amt. of change	% Change
CANADA									
Physicians and	I ¹	9,975	17,006	7,031	70.5	17,006	23,229	6,223	36.6
Surgeons	E ²	8,790	14,588	5,798	66.0	14,588	15,410	822	5.6
Dentists	I	6,287	12,337	6,050	96.2	12,337	15,693	3,356	27.2
	E	3,790	4,865	1,075	28.4	4,865	5,357	492	10.1
Consulting	I	9,628	14,692	5,064	52.3	14,692	19,278	4,586	31.2
Eng. and Architects	E	2,030	2,505	475	19.0	2,505	2,767	262	10.5
Lawyers	I	10,214	15,718	5,504	53.9	15,718	19,191	3,473	22.1
	E	4,970	7,113	2,143	43.1	7,113	8,374	1,261	17.7
Total	I	7,583	12,458	4,875	64.3	12,458	15,670	3,212	25.8
professions	E	29,400	46,719	17,319	58.9	46,719	52,134	5,415	11.6
Grand	I	3,149	4,348	1,119	38.1	4,348	4,947	599	13.8
Total	E	2,777,950	4,507,767	1,729,817	62.3	4,507,767	5,728,942	1,221,175	27.1
ONTARIO									
Physicians and	I	10,768	18,189	7,421	68.9	18,189	25,314	7,125	39.2
Surgeons	E	3,630	5,631	2,001	55.1	5,631	5,959	328	5.8
Dentists	I	6,548	13,174	6,626	101.2	13,174	17,621	4,447	33.8
	E	1,680	2,200	520	31.0	2,200	2,238	38	1.7
Consulting	I	10,718	13,593	2,875	26.8	13,593	19,102	5,509	40.5
Eng. and Architects	E	720	1,067	347	48.2	1,067	928	-139	-13.0
Lawyers	I	11,253	18,343	7,090	63.0	18,343	21,963	3,620	19.7
	E	2,050	2,874	824	40.2	2,874	3,424	550	19.1
Total	I	7,672	12,910	5,238	60.3	12,910	16,461	3,551	27.5
professions	E	12,750	19,478	6,728	52.8	19,478	21,367	1,889	9.7
Grand	I	3,613	4,498	1,335	42.2	4,498	5,136	638	14.2
Total	E	1,249,960	1,886,702	636,742	50.9	1,886,702	2,350,644	463,942	24.6

¹I is average income.

²E is number of income taxpayers in the particular occupational group.

SOURCE: Department of National Revenue, Taxation Division, *Taxation Statistics*, Queen's Printer, Ottawa, 1953, 1963, 1967.

lawyers, consulting engineers and architects, for all professionals, and for all income earners. Such data relating to Ontario and Canada are given in Table 5.1.

Finally, it is possible to set out a particular physician:population ratio as the standard, and to infer that there is a shortage in a given community if the ratio is lower than the standard and an excess if the ratio is higher than the standard. The data set forth in Appendix II, in particular those contained in Table A247 allow one to sort out areas with shortages in the different types of health care personnel and in hospital beds, once a standard ratio has been agreed upon.

The correspondence of equilibrium market price with the maximization of welfare can be demonstrated easily. Briefly, with a given money income and given prices of all goods and services that he purchases, the individual will maximize his total satisfaction (welfare) if he so balances his expenditures on different goods as to equate the satisfaction he receives from consuming the quantity of the good or service bought with the last dollar spent on each good or service. With any other expenditure pattern, he could increase his satisfaction by transferring dollars from the purchase of one commodity to the purchase of the other.

Now if a number of consumers are in the process of transferring dollars from the purchase of entertainment to the purchase of physicians' services, for example, there will be upward pressure on the price of the latter and downward pressure on the price of the former. (These price changes themselves will have the effect of reducing the net satisfaction gained from the last dollar spent on physicians' services and increasing that gained from the last dollar spent on entertainment.) Only when expenditure patterns of consumers are in equilibrium will pressure on prices cease. Accordingly, when prices are in equilibrium and roughly stable, consumers are indicating implicitly that their welfare is at a maximum given existing prices, and so on. That this is the case depends on the assumption that individuals attempt to maximize their satisfaction.

In a similar way, welfare maximizing behaviour on the part of suppliers of a particular health service can be illustrated. For example, a physician maximizes his satisfaction when the return he receives from the last hour spent providing general medical care is equal to the return resulting from the last hour spent providing specialist care. Any other allocation of time between these activities would imply that the physician could increase his satisfaction (welfare) by reallocating his work effort. If a number of physicians are in non-equilibrium positions and are in the process of readjusting their work effort, there will be downward pressure on the price received for providing the one service and upward pressure on the price received for providing the other service. This pressure on prices will cease only when physicians are at positions of maximum satisfaction with respect to the services they provide. They will be at, or moving directly to, this position if they attempt to maximize their satisfaction from work effort.

Assuming that consumers and suppliers attempt to maximize their satisfaction (welfare), either market prices will be equilibrium prices and will represent "best" possible prices, or the market forces of consumers and supplies will be in the process of establishing equilibrium prices. In that there are many consumers and many suppliers, it would seem that there is little to prevent the competitive forces discussed above from establishing equilibrium prices which correspond to positions of maximum satisfaction.

Note that under the general conditions described above, there is always the incentive to physicians, the suppliers, to use the least-cost combination of resources to provide a given level of service (such combinations are the most efficient com-

binations if they provide at least cost the given level of service). The incentive appears in the form of increased money income without sacrifice of either the quantity or the quality of health care provided. In short, under competitive conditions, the community is producing some mixture of goods and services represented by a point on its production-possibility curve (see Chapter 4).

Note also that the freely operating price system completely decentralizes the decision-making process. Each individual is given the responsibility of deciding to purchase those goods and services (health and non-health) which yield him the greatest satisfaction, and there are little or no overt decision-making costs imposed on society. The same is true of decisions in the labour market. Individuals make their decisions to supply labour services in the occupations which will yield them the greatest satisfaction.

Assuming that it is the responsibility of the government to ensure a satisfactory distribution of income among individuals, and that the government has accomplished this (through its income tax and income subsidy policies), the free market-price system appears to yield competitive equilibrium prices for health goods and services and competitive equilibrium income payments for health care resources. Furthermore, these prices and income payments seem to be consistent with maximum social welfare on the part of consumers and suppliers. The following example is developed to illustrate the operation of the price system in regulating the world supply of physicians among countries.

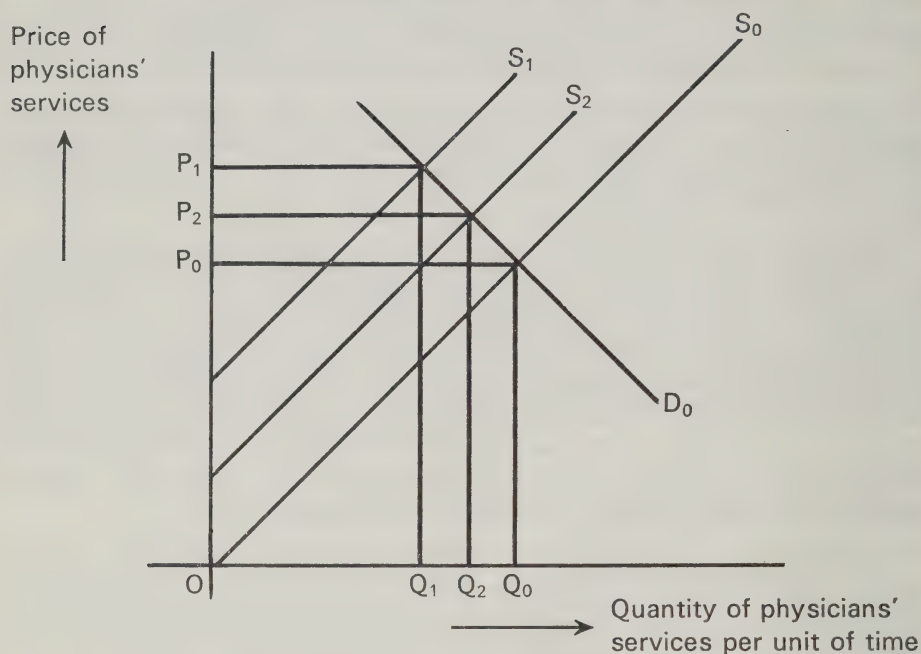
It is sometimes held that since a wealthy country such as Canada could train all the health care personnel that it needs, it should do so. (In particular, it should ensure that almost all foreign-trained personnel are barred from health care work in Canada.) The first part of the statement is valid only if a particular definition of "needs" is adopted; the latter, a *non-sequitur*, is at best uninformed opinion and, more than likely, a thinly disguised, self-interested statement of policy of particular groups. It is advantageous to set out a few of the implications of a policy which successfully prevents all foreign-trained personnel from providing health care in Canada regardless of their qualifications.

If we assume that the Canadian market for physicians is initially in equilibrium, any relative change in working conditions (income payments, living conditions) will affect the supply of physicians in Canada. If large numbers of Canadian physicians move to the United States³ we can expect upward pressure on the price of physicians' services in Canada. In turn, this upward pressure on prices likely will attract foreign-trained physicians to Canada. Finally, the arrival of any such foreign-trained physicians will counteract the aforementioned upward pressure on prices. The Canadian market for physicians' services is illustrated in Figure 5.5.

³Information on the actual movements to the United States of medical personnel and other persons is set out in the article, "U.S. Still Skimming the Cream", *Financial Post*, September 9, 1967, p. 32.

Without the entry of foreign-trained personnel, Canadian citizens pay a higher price for each service and the total volume of services provided in Canada is less than would otherwise be the case. On the assumption that the demand for physi-

Figure 5.5. Canadian market for physicians' services



Equilibrium price, P_0 , and quantity, Q_0 , are determined on the assumption that the only restrictions placed on foreign-trained personnel is that they pass "objective" examinations of abilities and qualifications.

Assume that, as a result of a change in living conditions in the United States relative to those in Canada, large numbers of Canadian physicians move to the United States. The effect of this movement is a decrease in the supply of physicians' services in Canada; the supply curve moves to the new position S_1 . This movement causes the price of services to increase to P_1 . At the high price P_1 , foreign-trained physicians find it profitable to immigrate to Canada and, after undergoing the appropriate examinations, to begin offering their services as physicians. This has the effect of increasing supply; the supply curve moves out to some position S_2 . As a result, price falls to P_2 .

In the final situation, the price, P_2 , is more than likely greater than P_0 and the quantity of physicians' services provided, Q_2 , is less than Q_0 .

Now consider this situation with a policy designed to exclude foreign-trained personnel on the basis of their "foreignness" alone. After movement of Canadian physicians to the United States, supply decreases to S_1 ; new equilibrium price is P_1 , and quantity Q_1 . In this case, price is higher and quantity of services supplied is lower than in the other unconstrained case.

cians' services is price inelastic, the income of physicians remaining in Canada is much higher than it was originally and certainly higher than if foreign-trained physicians were allowed, on the basis of successful completion of examinations, to move freely from one country to another.

Complete exclusion of foreign-trained physicians may be expected to be harmful to the average Canadian consumer of physicians' services, harmful to the potential new Canadian physician, and beneficial only to those Canadian physicians who remain in Canada — in our example, those who do not move to the United States.⁴

Even in the case in which foreign-trained physicians have on average lower qualifications than Canadian-trained physicians, there is sound economic reason for permitting foreign-trained physicians to practise in Canada. For this means that Canadian consumers are able to purchase up to the same amount of care from Canadian physicians and are able to purchase care also from "foreign" physicians.⁵

Although the price system does allocate resources, an important question to ask is, "Does it allocate resources optimally?" In order to demonstrate that resources would be allocated optimally by the price system, it is necessary to postulate the presence of perfect competition and the absence of externalities. Perfect competition involves the presence of numerous buyers and sellers, homogeneity of product, perfect information, and perfect factor mobility. Externalities exist whenever one individual's use of factors of production or products affects another individual — that is, whenever there are spillover effects. Clearly, perfect competition does not, and externalities do, exist in the health sector. Thus it is unlikely that the price system will allocate resources optimally. *It still remains to be demonstrated, however, that the price system allocates resources less optimally than any other general system of resource allocation.*

Government Allocation and Optimality

Just as it is possible to demonstrate the correspondence of the price system with optimal resource allocation, so it is possible to demonstrate the correspondence of government allocation with optimal resource allocation. In both cases, highly restrictive assumptions must be made. In addition, in the case of government allocation, the administrative costs of centralized decision-making must be considered. Although these are often ignored by proponents of government action, they are important; not so much because they involve in practice 10 to 20 per cent of

⁴The international movement of health care personnel and the resulting equilibrium of labour markets is the subject of a recent, well-written B.A. thesis. See D. Black, *The Role of International Flows in the Adjustment of Canadian Labour Markets for Health Professionals*, unpublished B.A. thesis, Queen's University, 1967.

⁵Recall, also, the discussion of the gains from specialization.

expenditures, but because they should include the costs of making non-optimal decisions. For in order to allocate resources in an optimal fashion, a government requires information on the tastes and preferences of each individual with respect both to his consumption of health care and his supply of work effort as a health care resource. In short, for optimal resource allocation, a government must solve the economic problem outlined in Chapters 2, 3 and 4; that is, it must determine what health goods and services and how much of each to provide, it must determine what health care resources should provide particular health goods, and it must determine who receives these goods. This problem of choice should not be minimized, for the bits of information required to solve the economic problem are all but innumerable.

Finally, we might mention the problem of finding the optimal degree of specialization. In a free market-price system, specialization is limited by the extent of the market. With government allocation, is there any real check to specialization? For example, heart transplant operations presently involve an exceedingly large expenditure of real resources that could have been used elsewhere in the health sector. It is possible, of course, that these operations will ultimately yield benefits in excess of their costs; but on the other hand, they may not. In the meantime, scarce resources are being allocated to a particular specialty — that of heart transplants. We might well ask if this is the appropriate time in the history of society to be specializing in this area.

The Justification for Government Intervention

The principal reason for interfering with the operation of the free market-price system may be described in a word — “externalities”.⁶ Externalities may be usefully classified into two broad groups: externalities of production, and externalities of consumption. In turn, each of these categories may be further subdivided into external economies and external diseconomies.

An example of external economy of consumption is the gain to all members of the community when one of their number receives a vaccination against a contagious disease; the larger the number of other individuals that are vaccinated, the smaller is the probability that any other unvaccinated member will contract the particular disease. Where the total cost of vaccination to the community against such a disease is less than the total direct and indirect costs to the community of combatting the disease (times the probability of the disease appearing in the community), there would seem to be a good case for a government-sponsored universal vaccination program. The same criterion could be used for other highly contagious diseases.

⁶More precisely, externalities justify government intervention *only when* interpersonal markets cannot be set up to deal with the externality, *and when* the costs of the government arrangement are less than the expected benefits. Clearly, many externalities do not justify government intervention because of the non-fulfilment of either or both conditions. See R. Turvey, “On Divergences between Social Cost and Private Cost”, *Economics*, No. 30, August 1963.

Another of the broad classes of externality also provides a possible case for government intervention — namely, external economies of production. The elimination of malaria-infested swamps is an example of a preventive health measure which communities frequently decide to provide on a collective basis.

An important external diseconomy of consumption would be the effect of the use of prescribed drugs where such an effect caused uncontrollable actions that affected persons other than those consuming the drug. A case might be made for the controlled provision of those drugs or other health goods and services which have such effects.

An example of an external diseconomy of production is more difficult to find. It is possible to think of a physician being careless in his treatment of a given patient and because of this, allowing a patient with a highly contagious disease to live in the community. To the extent that this is a highly probable occurrence, there might be a case for government licensure of health care personnel who provide services to individuals with such a disease.

We might also mention what I shall call “quasi-externalities”. These are related to effects of other government welfare programs on the private-public nature of health care. For example, if the government has decided to provide welfare relief to families whose breadwinner is absent from work or indeed is unable to work because of sickness, then there might well be a case for government providing health care in order to alleviate claims for welfare relief stemming from sickness.⁷

An economic characteristic of some types of preventive health care is the presence of large-scale (internal) economies of scale. For example, the optimum number of firms for the provision of purified water supplies, fluoridated water supplies, sewage treatment systems, and so on, is probably one. This is not, however, sufficient economic reason for having government, rather than private individuals, provide the single system. In order to justify the former, it is necessary to prove that it not only can in theory but also will in practice do the job more efficiently than the latter.

Although some health goods and services may rightly be judged public goods on the basis of uncompensational externalities, the vast majority of them are probably private goods with few public aspects. In the end, what may distinguish health goods and services is not their public aspect, but rather their complexity and the relative lack of information about them. Notwithstanding this comment, most health goods and services yield returns that are almost wholly private.

⁷In a similar fashion, if government assumes responsibility for providing health care, other goods which might have been almost purely private take on a large public aspect. For example, the safety features of the private automobile take on a public aspect much larger than would be the case if governments were not providing hospital care for victims of automobile accidents.

TABLE 5.2
Sources of Finances for Current Expenditure on Health Services

Country	Year	Total (millions)	General government (millions)	%	Compulsory Social Insurance (millions)	%	Other Agencies (millions)	%	Recipients (millions)	%
All services										
Australia	1960/61	A£ 346	176	50.9	8	2.3	29	8.2	133	38.5
Canada	1961	C\$ 2,045	376	18.4	604	29.6	319	15.6	745	36.4
Ceylon	1957/58	Rp 214	125	58.2	—	—	9	4.1	81	37.7
Czechoslovakia	1961	Kcs 7,264	6,259	86.2	377.5	5.2	124	1.7	503.5	7.0
Federation of Rhodesia and Nyasaland	1960/61	£ 21.3	8.6	40.4	—	—	4.5	21.1	8.2	38.5
Finland	1961	F.Mk. 691	402	58.2	—	—	10	1.4	279	40.4
France ¹	1963	Fr. 16,374	2,456	15.0	10,981	67.1	1,218	7.4	1,719	10.5
Israel	1961/62	I£ 320	91	28.5	10	3.25	133	41.5	86	26.8
Kenya	1961/62	£ 8.55	3.18	37.2	0.47	5.5	0.51	6.0	4.39	51.4
Netherlands ¹	1963	G 2,344	486	20.7	994	42.4	98	4.2	767	32.7
Poland	1961	Zl 17,157	13,628	79.4	—	—	—	—	3,529	20.6
Sweden	1962	Kr 3,683	2,440	66.3	450	12.2	—	—	793	21.5
Tanganyika	1961/62	£ 5.36	2.82	52.6	—	—	0.84	15.7	1.7	31.7
United Kingdom	1961/62	£ 1,088	922	84.7	—	—	9.6	0.9	156.4	14.4
U.S.A. ¹	1961/62	\$ 29,859	6,683	22.4	491	1.7	8,456	28.3	14,228	47.6
Yugoslavia ¹	1961	Din 176,873	17,363	9.8	135,529	76.6	12,981	7.3	11,000	6.2
Chile	1961	Esc 301.3	70.3	23.1	20.5	6.7	41.7	13.7	171.8	56.5

Organized
services only

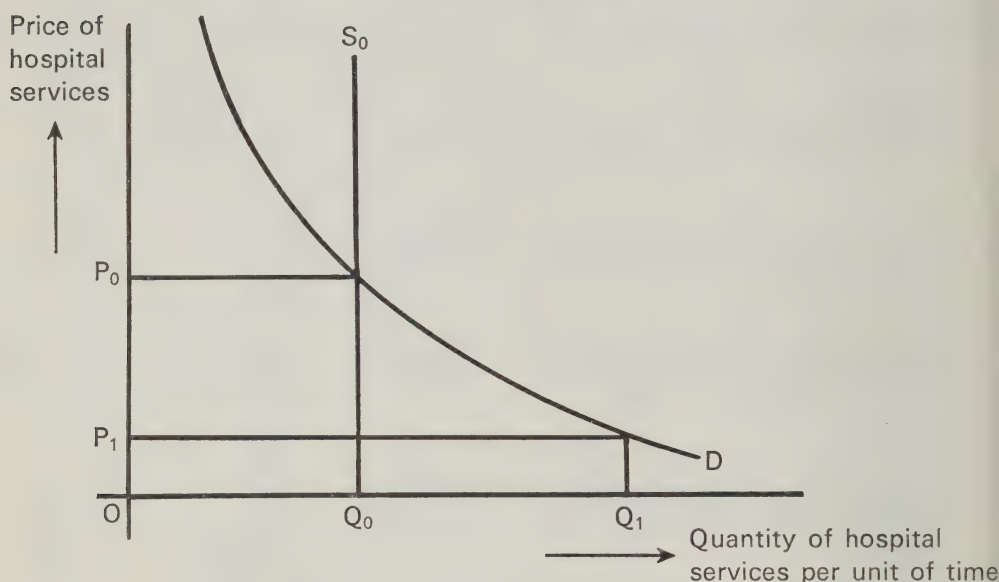
Costa Rica	1961	Col	40.8	11.0	27.0	—	—	19.6	48.0	10.2	25.0
Cyprus	1961	£	1.04	0.98	94.4	0.01	0.7	—	—	0.05	4.9
Hong Kong	1961/62	\$	115.9	112.7	97.2	—	—	—	—	3.6	2.8
Iran	1961/62	Rial	3,258	2,628	80.7	454	13.9	176	3.4	— ²	—
Ivory Coast ¹	1961	FCFA	2,396	2,015	84.1	—	—	381	15.9	—	—
Jamaica	1961	£	3.95	3.90	98.7	—	—	—	—	0.05	1.3
Peru	1961	Sal	1,598	688	41.8	728	45.6	201	12.6	—	—
Philippines	1961/62	Peso	127.2	121.1	95.2	—	—	—	—	6.1	4.8
Senegal	1961	FCFA	4,134	2,944	71.2	—	—	1,190	28.8	—	—
Singapore	1961	M\$	50.25	47.26	94.1	—	—	1.22	2.4	1.77	3.5
Venezuela	1962	Bol	1,134	742	65.5	146	12.9	38.7	3.4	207	18.2
<i>Incompleted returns of organized services</i>											
Pakistan	1961/62	Rp	511	125	24.55	—	—	64	12.6	321	62.9

¹Including depreciation.²Stated to be negligible.SOURCE: B. Abel-Smith, *An International Study of Health Expenditure*, Public Health Papers, No. 32, World Health Organization, Geneva, 1967, p. 139.

The Existing General System of Resource Allocation

The general system of resource allocation found in most countries is a mixed one; it is a mixture of the market-price system, of direct government provision of health care, and of direct government control of the processes of providing care. The data in Table 5.2 illustrate the general systems of resource allocation found in twenty-eight different countries. With respect to all health services, the source of current expenditure coming from individual recipients, as a percentage of all sources, was a high of 56.5 per cent in Chile and a low of 6.2 per cent in Yugo-

Figure 5.6. Hospital insurance and the quantity of hospital care demanded by patients



Prior to the introduction of insurance, the equilibrium average price of hospital services is P_0 and the quantity provided is Q_0 . Assuming that hospital insurance reduces the direct price of an average hospital service to P_1 (which may be either a token payment of one dollar per day or the transportation costs involved in presenting oneself for receipt of care), the quantity of hospital services demanded increases from Q_0 to Q_1 ; persons requiring ambulatory care now present themselves at emergency departments rather than at their family physician's office, and all kinds of people attempt to use hospitals for accommodation rather than pay the high price of hotels, nursing homes, old age residences, and so on.

The quantity Q_1 minus Q_0 represents excess demand which, by definition, cannot be satisfied with the existing hospital facilities represented by the vertical supply curve, S_0 . There are thus three alternatives open to the government. It may allocate scarce hospital care resources to the task of setting up a rationing scheme; it may increase the total allocation of resources to the health sector, so that the total quantity demanded will be satisfied; or it may do a little of each of these.

slavia. The Canadian figure of 36.4 per cent was eighth highest of the seventeen countries reporting the sources of finance for all health services.

In contrast, direct government activity accounted for a high of 86 per cent of current expenditures in Czechoslovakia and a low of 9.8 per cent in Yugoslavia. The Canadian figure of 18.4 per cent is third lowest of the seventeen countries reporting on all health services.

We might now proceed to look briefly at some of the economic aspects of this mixed system of resource allocation.

Hospital Insurance and Hospital Utilization: by Patients

The introduction of hospital insurance, with or without nearly universal coverage, may be expected to increase the quantity of hospital services demanded. This will, of course, result in a problem of rationing the limited supply of such services and, if the government attempts to increase the supply of these services, will result in sharply rising hospital costs—in particular, in sharply rising allocation of resources to the outpatient and emergency departments of hospitals.⁸ The implications of hospital insurance are illustrated in Figure 5.6.

If at least the same level (quantity and quality) of health care is to be given after the introduction of hospital insurance as before, hospital costs *must* increase; for it is now necessary to use some manpower resources to ration the limited supply. Of course, if the supply of resources allocated to the hospital sector is held constant, then the level (quantity and quality) of health care must fall. On the assumption that the level of care remains the same or increases (and it is unlikely that a government would allow the level of hospital care to fall),⁹ hospital costs may be expected to rise following the introduction of hospital insurance.¹⁰ In practice, governments appear to accede rapidly to pressures for increases in the allocation of resources to the hospital sector.

In addition to the upward pressure on hospital expenditures resulting from a hospital insurance plan, increases in personal income are likely to cause shifts in the demand for hospital care. To the extent that these shifts are not accompanied by the building and staffing¹¹ of new hospitals, we expect both total expenditures on hospital care and per patient expenditures to rise.¹²

⁸Data on hospital costs presented in Table 3.1 and A278, respectively, are consistent with these two expectations.

⁹Although, in fact, the government of the United Kingdom may have done just this. J. M. Buchanan, *The Inconsistencies of the National Health Service*, I.E.A. Occasional Paper 7, Institute of Economic Affairs Ltd., London, 1965.

¹⁰This might not be the case if there were large unexploited economies of scale in the production of hospital care.

¹¹Imperfections in the process of training additional personnel (in terms of restrictions on entry) will have the effect of increasing the wage rate required to maintain the given complement of hospital personnel; this will in turn reflect in increasing per patient costs for a given quality of care.

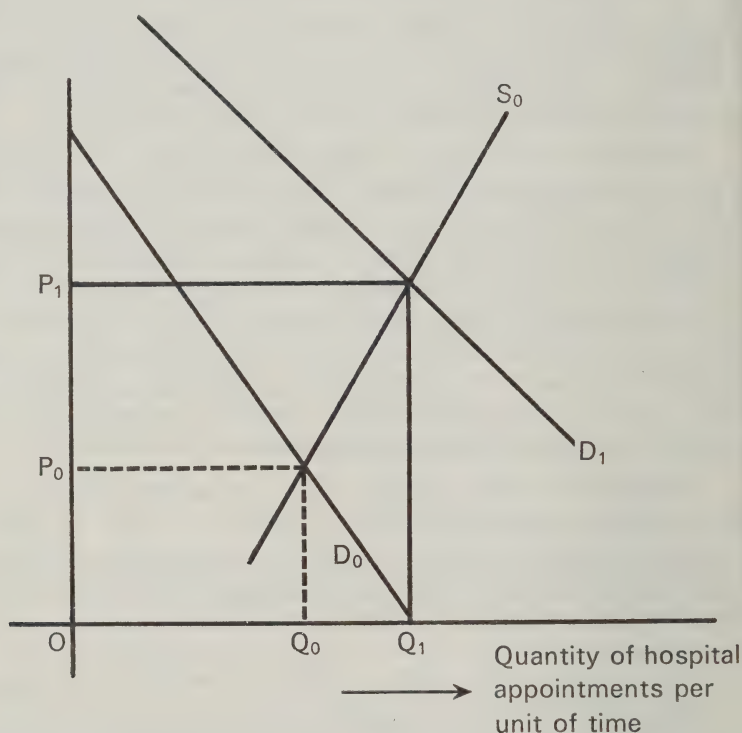
¹²Additional pressure on per patient hospital costs could result also from a rise in the quality of care provided in hospitals.

In addition, the reduced price of a service that can be provided only in the hospital setting may be expected to result in an increased rate of surgical and other procedures.

Another interesting effect of hospital utilization relates to the demand for part-time hospital appointments and/or for teaching positions which involve hospital appointments. The demand of physicians for such appointments is represented in Figure 5.7.

Figure 5.7. Hospital insurance and the demand by physicians for part-time hospital appointments

Price of the hospital appointment in terms of the number of hours of teaching or charity care that must be rendered by the physician for a token honorarium



The initial equilibrium price is given as P_0 and quantity as Q_0 . Following the advent of hospital insurance and the implied increased attractiveness of a hospital appointment, demand increases to D_1 . This yields a new equilibrium price and number of such appointments.

Hospital Insurance and Hospital Utilization: by Physicians

Hospital insurance, if unaccompanied by comprehensive medical care insurance, lowers the cost to the physician of providing hospital-based care versus ambulatory clinical care. Accordingly, he may be expected to transfer his activities from his private office to the hospital setting, as far as this is possible.

The increased attractiveness of the hospital appointment is directly associated with the command over hospital beds and facilities that a hospital appointment usually involves. Recall that the number of beds available relative to the quantity demanded falls with the introduction of hospital insurance; there is increased competition for the limited number of beds. We thus predict that the effective price and number of hospital appointments will increase.

Hospital Insurance, Social Cost of Health Care, and Piecemeal Policy Suggestions

The efficient allocation of resources necessitates the balancing of marginal social benefits with marginal social costs. It is often possible, however, in looking at particular problems, to forget about the general problem.¹³ For example, in concentrating on the provision of dental care in the most efficient way, a government might decide to institute an educational program for the training of dental hygienists. The aim of the program would be to provide a better correspondence between job functions (in the provision of various aspects of dental care) and acquired abilities. If these trained hygienists then entered a world in which dentists employed them only for such tasks as bookkeeping, reception of patients, typing, and so on, then the training of such personnel would probably mean a movement away from the position of welfare attained prior to instituting the program. Society then would have little or no additional dental service; rather it would have clerical work being performed by overly trained personnel.

The same problem probably has resulted from the introduction of hospital insurance without an accompanying introduction of medical care coverage. For example, there will be some health care services that could be provided at lower cost in the physician's office than in the hospital setting. Such services are represented by Q in Figure 5.8.

The lower price of the service in the hospital setting leads to a reduction in demand for the service in the physician's office, probably resulting in an increase in price and a decrease in the quantity provided in the office.

By assumption, the average cost of providing the service is lower in the physician's office than in the hospital setting. The advent of hospital insurance, however, results in more of the service being provided in the high-cost hospital setting and

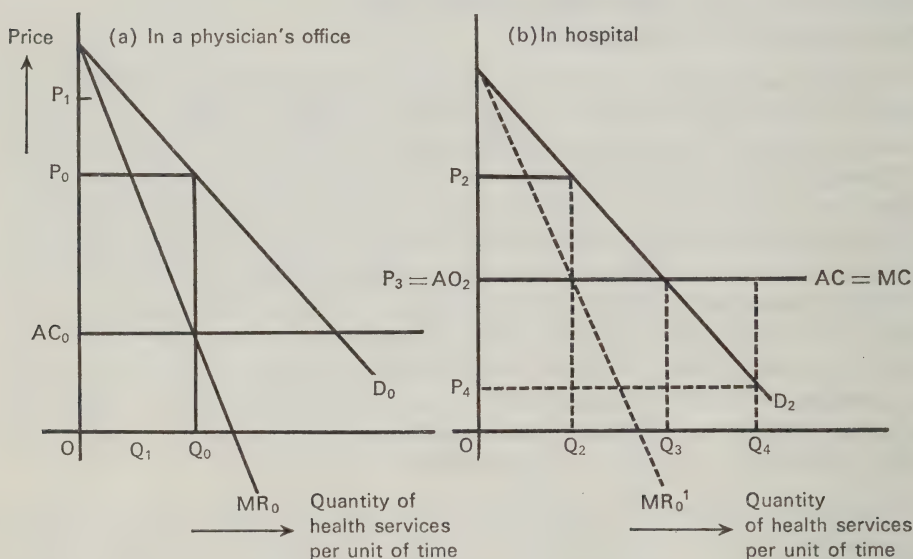
¹³These problems have recently been re-emphasized by K. Lancaster and R. G. Lipsey in "The General Theory of Second Best", *Review of Economic Studies*, Vol. 24, 1956-1957, pp. 11-32.

less in the low-cost setting of the physician's office. Accordingly, total social cost for providing a given level of the service in question has increased.

The Existing Framework of Licensing Procedures

It is frequently alleged that health goods and services are different from other goods bought by consumers, in that the consumer has much less information about health care than about other goods. Except for a very small percentage of health goods and services, this is particularly difficult to justify in the light of the complex durable goods that most consumers purchase. In that there is a dearth of infor-

Figure 5.8. Hospital insurance and the social cost of health care in a physician's office and in hospital



Demand for the service in the physician's office is given by D_0 in part (a) of this diagram; average cost of the service in the physician's office is given as AC_0 ; price is a profit-maximizing monopolist.¹ Similarly, initial prehospita insurance demand for the same service in the hospital setting is given as D_2 and average cost as AC_2 (greater than AC_0). The price can be P_2 , on the assumption of profit-maximizing behaviour on the part of private hospital owners or P_3 on the assumption of average cost pricing on the part of publicly owner and/or operated hospitals. Quantity supplied is thus either Q_2 or Q_3 .

The introduction of hospital insurance lowers the price of the service in the hospital to at least P_4 . At this price, quantity demanded and, we assume, quantity supplied is Q_4 .

¹R. K. Kessel, "Price Discrimination in Medicine", *Journal of Law and Economics*, Vol. 1, October, 1958, pp. 20-53.

mation, one would expect the free market to develop its own centres for the distribution of information.

The information that is probably most essential to the consumer of health care is not information about particular health goods; rather, it is information about the personnel that provide health services. Again, one would expect the free market to develop ways of disseminating information about the capabilities of particular health personnel.

In that a community feels that information about health care personnel should be made available through government support, there is perhaps a reasonable argument in favour of setting up a certification board. Such a board, staffed perhaps by a balance of medical and non-medical individuals, would certify personnel who had passed certain objective tests. With this information, a consumer could make up his own mind whether to purchase health care from certified or non-certified personnel.

Lack of information about health care and health care personnel would not seem to be in itself sufficient economic justification for compulsory licensing procedures. A non-compulsory certification board (under the direct control of a government committee and not placed in the control of any particular profession) would probably be the most effective and least costly (in terms of infringements on the rights of individuals to purchase health care services from whomever they please and/or provide health care to consumers) for providing information collectively.

The argument that society should provide information collectively about the nature of health care and the expected competence of health care personnel (because there are large economies of scale in the provision of such information, well as external economies of production) should be distinguished from the argument that society must attempt to ensure that no unqualified person attempts to provide health care. This latter argument is usually based on the premise¹⁴ that there are segments of the population who, even with information, would either ignore it or be ignorant of how to use it. If this view¹⁵ is held, then there may well be a case for compulsory licensure. That this is justification for compulsory licensure in itself depends on how one weighs the costs of licensure (in terms of the infringements on the rights of individuals as suppliers and/or buyers of health care, and of the redistribution of income resulting from the exercise of monopoly

¹⁴We have already noted the case for licensure if there are widespread external diseconomies of production; for example, if there are commonly present in the community contagious diseases, such as the plague, which if improperly treated would cause a great deal of harm to the community at large.

¹⁵This paternalistic view seems contradictory to the view commonly held in the democracies of Western civilization, that adult individuals are intelligent beings capable of choosing men to represent them in different levels of government.

power by the occupational groups that are licensed)¹⁶ and the benefits (in terms of the protection¹⁷ offered the population groups noted above).

The existing framework of licensing procedures and accompanying regulations and educational requirements is a complex one. Further, responsibility for maintaining the operation of this framework is in practice left to powerful bodies composed of physicians themselves. However much they may disclaim it, these men can be expected to act primarily on behalf of themselves and their medical colleagues.¹⁸ The geographically widely dispersed, unorganized consumers of health care are no match for the highly organized medical profession. One can therefore expect that the institutional framework of licensing procedures may not be operating in a manner that produces greatest satisfaction to the consumer. That is, one can expect that there will not be a close correspondence of duties performed to the capabilities of the various human health care resources.

In Chapters 7, 8 and 9 we examine in detail the job functions required for three different kinds of health care. We then inquire whether these job functions might be better carried out by health care resources with somewhat different capabilities than those that now exist. In this vein we examine the use of the dental health nurse for the provision of dental care to children, the use of the midwife for the provision of obstetrical care, and the use of public health nurses for the provision of rural health care.

Traditional Practices

As discussed in Chapter 4, traditional practices can be expected to have a direct effect on the way in which health care is provided and thus on the optimality of the allocation of resources. We have chosen to examine in detail the relationship between one traditional practice and the efficiency with which health care resources are combined to provide health care; in the following chapter we examine solo practice and specifically inquire whether group practice might represent a more optimal allocation of health care resources.

¹⁶For indisputable information on the use of such power by the medical profession, see D. R. Hyde and P. Wolfe, "The American Medical Association: Power, Purpose and Politics in Organized Medicine", *Yale Law Review*, Vol. 58, May 1954, pp. 938-1022; and R. K. Kessel, "Price Discrimination in Medicine", *The Journal of Law and Economics*, Vol. 1, October 1958, pp. 20-53.

¹⁷For recent information on the lack of protection afforded the consumers of health care in Ontario and Nova Scotia by our existing licensing procedures, see K. F. Clute, *op. cit.*

¹⁸It must be noted also that they may, in practice, confuse their attempts to ensure the quality of health care resources with the practical result that such improvements in quality limit the number of such resources and thereby cause the incomes of those in practice to increase; see Chapter 4 on the trade-off between quality and quantity.

Chapter 6 Family Health Care: Group Practice Versus Solo Practice

“Are we justified in allocating resources for the purpose of encouraging the development of group practice?” This is the question on which we attempt to throw light in this chapter.

Our concern with group practice derives from our consideration of specialization and division of labour in a health sector characterized by the predominance of solo practice; for the form of organization in which health care resources are combined directly affects the efficiency of these resources. Therefore we will try to determine whether human and non-human resources in the health sector might be made more efficient by encouraging the development of group practice, and whether the economic structure of the health sector might be altered by de-emphasizing the use of the traditional solo practice form of organization.

In examining group practice versus solo practice, we will consider the following aspects of good quality, efficiently provided health care: personal care, continuity of care, control of quality, organization of time both for effective performance at work and also for continuing medical education, the efficient use of human health care resources, hospital utilization, and the real social costs of care. First, however, we look briefly at the existing use of the two organizational forms of solo and group practice.

The Nature of Group Practice

Although at the turn of the century nearly all physicians were in general practice, for the most part working by themselves, the trend for many years has been towards increased division of labour in the medical care of the human body. There is still a tendency, however, for the physician, even when dealing with a small portion of the body or a few diseases, to conduct his practice in a relatively isolated fashion. Of the total number of physicians responding to the questionnaire sent by the Royal Commission on Health Services,¹ 67.2 per cent were solo practitioners (see Table 6.1).

In the United States, group practice is much more widespread (see Table 6.2). Note especially the large percentage of specialists that practise in groups — namely, 79 per cent of all specialists.

¹S. Judek, *op. cit.*

TABLE 6.1

Number and Percentage Distribution of Active Physicians in Private Practice, by Type and Auspices of Work, Canada, 1962

Auspices	Type of Work						Total	
	General Practitioner		Specialist		Consultant		Number Reporting	%
	Number Reporting	%	Number Reporting	%	Number Reporting	%		
Self-Employed	2,686	67.0	2,055	65.3	469	78.6	5,210	67.2
Partnership	820	20.4	567	18.1	80	13.4	1,467	18.9
Group Practice	504	12.6	522	16.6	48	8.0	1,074	13.9
Total ¹	4,010	100.0	3,144	100.0	597	100.0	7,751	100.0

¹Excludes Yukon and Northwest Territories.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962.

TABLE 6.2

Percentage Breakdown by Degree of Specialization Physicians in Group Practice, United States, 1959

	General Practitioners	Part Specialists	Full Specialists
Physicians in Groups	24.8	4.7	70.5
Total U.S. Physicians	37.9	13.1	49.0

SOURCE: S. D. Pomrinse and M. S. Goldstein, "The 1959 Survey of Group Practice", *American Journal of Public Health*, Vol. LI, May 1961, pp. 671-682.

Definition

In his work for the Royal Commission on Health Services, J. A. Boan has advanced the following definition of group practice:

Medical group practice is a formal association of three or more physicians providing services in more than one field or specialty, with income from medical practice pooled and redistributed to the members according to some pre-arranged plan.²

This definition is somewhat narrow for our purposes; for surely large-scale gains in efficiency can be achieved without the pooling of income and without the comprehensiveness of the group envisaged by Boan. On the other hand, since we are concerned with family health care, we will continually have in mind a

²J. A. Boan, *Group Practice*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1966, p. 7.

group practice that is comprehensive in its coverage of the family's health care needs and that provides this need by sharing human and non-human health care resources.

Personal Health Care

Efficiently organized care treats the whole individual or family, and works towards comprehensive care. It thus includes a broad range of preventive and rehabilitary services, as well as programs to meet the specific needs of such groups as pregnant women, infants, children, adults and the aging.

At a Conference sponsored by the Citizens' Committee for Children of New York in 1963,³ Dr. George G. Reader defined high quality care as involving 1) comprehensiveness in the treatment of the whole patient; 2) continuity and coordination; 3) a view of the patient as a part of the basic family unit. Further, "patients should be able to be transferred quickly from one kind of facility to another, from one kind of specialist to another, with good communication and no loss of feeling for the patient who is being passed around, and with more efficiency and less cost".

The importance of the "father confessor" role of the physician should be considered also. In a study of a small Nova Scotia community,⁴ Dr. D. C. Leighton found emotional symptoms in as many as 65 per cent of cases, most of which could be treated by a family physician; only 4.7 per cent in the study had distinct psychiatric complaints. G. A. Silver, in the study of Montefiore Medical Group's Family Health Maintenance Demonstration, found a disturbing pattern of emotional problems (see Table 6.3).

TABLE 6.3
Emotional Problems in Study Families by Family Member, Family Health Maintenance Demonstration, New York

Family Member	All Members	With Problems	
		Number	Per cent
Father	126	57	45.2
Mother	126	81	64.3
Children 6-18	141)	63)	44.7)
Children 1-5	108) 249	38) 101	35.2) 39.0

SOURCE: G. A. Silver, *Family Medical Care — A Report on the Family Health Maintenance Demonstration*, Harvard University Press, Cambridge, Mass., 1963.

³G. G. Reader and M. Cherkasky, "What Is High Quality Medical Care for Children and Their Families and How Can It Be Achieved?", Report of a Conference Sponsored by the Citizens' Committee for Children of New York, *Bulletin of the New York Academy of Medicine*, Vol. XXXIX, June 1963, pp. 336-388.

⁴D. C. Leighton, "The Distribution of Psychiatric Symptoms in a Small Town", *American Journal of Psychiatry*, Vol. CXII, March 1956, pp. 716-723.

One of the criticisms of the larger type of medical unit such as group practice is that patients are treated in a cold, *impersonal* manner, as objects of scientific interest. The roots of such arguments are real; they probably stem from the treatment given patients in some large hospital outpatient and welfare clinics, and indeed in some group practices. In addition, with the advance of medical knowledge and the ensuing specialization of medical tasks, there is probably, as often observed, a tendency to replace the "art" of medical care with the "science" of medical care. Although the latter is to a great extent desirable, the former must not be forgotten. That is, while being treated by a team of physicians, the patient probably should not be exposed to an "assembly-line" approach.

Clearly, "the clinic physician has a more difficult challenge in this area than the solo practitioner if for no other reason than the size of the professional business organization necessary to conduct a pooled type of practice".⁵ The treatment of a human being *as a human being* is surely one of the great challenges of group practice.

Yet physicians in group practice are in the ideal situation to provide personal care. As a first step, each patient could choose a personal physician from among the members of a group. This physician would be the patient's principal health care resource, and he would request specialists to see his patient when necessary. This personal physician, an important basic element in the programs of some prepaid group plans such as the Kaiser Foundation Permanente Plan noted earlier, has been aptly termed a "primary" physician.⁶

It is in such a role that the general practitioner, who sometimes feels that he is rapidly becoming outmoded by the growth of specialization, can find a renewed importance within the medical care team. As Dr. Neiman has conservatively estimated, some 85 per cent of all medical problems, including diagnosis and treatment of most medical cases, diagnosis of most and treatment of minor surgical conditions, obstetric cases, routine paediatrics, and support of psychoneurotic conditions, can be handled by the general practitioner.⁷

By handling the day-to-day complaints of his patients, the personal physician could surely save the time of specialists. In fact, the training of the general practitioner might be reoriented to take further advantage of this role; he could be trained in such a way as to be well versed in diagnostic procedures, able to recognize the need for specialized diagnoses, able to treat routine illnesses within the

⁵E. P. Jordan, "Challenges to Medical Clinics and Group Practice", *Group Practice*, Vol. IX, November 1960, p. 862.

⁶L. E. Beaton, "What the Medical Profession Can Be", *The Journal of Medical Education*, Vol. XL, January 1965, Part II, pp. 35-44.

⁷T. S. Neiman, "The General Practitioner in Prepaid Group Practice Plans", *American Journal of Public Health*, Vol. LIII, October 1963, pp. 1635-1643.

framework of the group facilities, and able to diagnose and/or treat most psychological and psychiatric conditions. Such a person would truly be a specialist in family medicine.

Because of this valuable role, a general practitioner even as presently trained should probably be included in most multispecialty groups.

Public health nurses working in a group practice also can be of much use in ensuring personal health care. They can meet and/or talk with all potential patients. By becoming aware of the exact nature of the patient's ailment and with the help of personal knowledge, they can make a preliminary diagnosis which is then passed on to the physician. Such personnel frequently are used for this and other purposes in British clinics. Similarly, social workers may be very useful when specific cases arise involving emotional and sociological problems.

Thus, there seems no inherent reason why group practice could not offer the same level of personal care as, if not a higher level than, that provided by the solo practitioner.

Continuity of Care

When confronted with a case which he cannot handle fully and competently, the individual physician has two choices: to refer the patient to another physician who is capable of handling the problem, or to treat the patient to the best of his own abilities. The latter presumably leaves the patient with grossly inadequate care; the former is surely the desired one.

It has been said that the solo practitioner no longer operates in isolation but is able to, and in fact does, consult others by lifting the telephone. Further, with modern methods of transportation, he frequently refers patients to offices separated by considerable distance.

Hospital consultation is probably the most widely used method of consultation by solo practitioners. For when physicians have hospital privileges, they have patients within easy reach of consultants, and presumably can seek and find advice fairly easily.

Outside the hospital settings, however, the solo practitioner may hesitate to seek consultation. He may fear that his patient will consider him incompetent if he telephones for advice when the patient is in his office. Similarly, he may fear that the consultant will retain a patient permanently once the patient has been referred. Clute had complaints that certain specialists would "steal" patients.⁸ This seems to reveal undesirable, if not unethical, behaviour within the profession. Whether the danger is real or imagined, its possibility must surely affect a general practitioner's predilection to refer.

⁸K. F. Clute, *op. cit.*

After studying a fairly large sample of Ontario general practitioners, the same author concluded that there were "patients whom the practitioner should have referred but whom he did not either refer or apparently seriously consider referring"⁹ in 30 per cent of the practices. As he considered only the cases that were clearly serious, this was a conservative estimate.

The question arises as to whether the same problem exists among specialists. There would seem to be a smaller likelihood, as patients visit a specialist for disorders of specific parts of the body. To the extent that many special fields overlap as new subspecialties emerge, the danger is present and the probability of the fears being justified is greater. This would be the case especially with specialists who may encompass the area of several narrower fields, such as internists, surgeons and anaesthesiologists.

In the absence of a referral, the patient may of course decide to seek the help of other physicians on his own initiative; but by visiting several independent physicians, he may suffer from discontinuity of care as he proceeds from one physician to the next. Unless there is close cooperation (and this is unlikely in this case) a significant waste of time and energy results from the taking of the medical history a second time or more. In addition, vital information held by the personal physician but considered unimportant by the patient may be omitted. In the end, a person might have his records scattered across the city, and one physician could be unaware of diagnosis and treatment by others. This leads to poor quality care. Even when there is consultation between physicians, complete records cannot be transferred without difficulty and inconvenience. Further, although solo practitioners may claim to work in groups and do not need a formalization of the procedure, these "groups" are at best loose and transient, with individuals opting out or choosing new consultant colleagues at will. Thus, there is an ever-present possibility of leaving the patient in mid-stream during the process.

In contrast, when visiting a group practice of sufficient size and diversity, the patient has the advantage of "one stop" medical care. Should a particular specialist be required, consultation can take place almost immediately without problems of delay and formality; if thought necessary, an appointment can be easily arranged. A seriously ill person who needs to be seen by several physicians and technicians can clearly benefit from the group practice arrangement.

Continuity in the care of a family also is served by group practice. Rather than have members of a family visit several offices in various parts of a city or district (so that, for example, the mother can visit a gynaecologist, the grandmother an internist, and the children a paediatrician or optomologist), through group practice privately practising physicians can provide consolidated family care.

⁹*Ibid.*

Finally, the accumulation of all medical records in a single file, readily available to all physicians within the group, ensures continuity of medical care. We might note that the Professional Standards Committee of the American Association of Medical Clinics stated in their 1960 Report that "the keeping of medical records was essential to maintaining the highest standard of patient care".¹⁰

With group practice, the consumer thus acquires complete medical care without incurring the costs associated with discontinuous care.

Organization of Time and Continuing Medical Education

As medical needs occur at any time, one of the basic precepts of good quality health care is that it be available, if not in a complete form at least on a temporary basis, at all times. There is thus pressure on the solo practitioner to put himself on call at night, on weekends, and during holidays. This would seem to have a direct influence both on the effectiveness with which a physician provides care during regular office hours and also on the amount of time that he can devote to keeping abreast of medical knowledge.

It is instructive to examine the activities of physicians. In Table 6.4, the total hours worked are broken down by specialty and type of service for solo practitioners.

In 1962, the average solo physician worked 49.13 hours a week. This does not allow for time spent travelling, which was probably considerable.

Clute found that many general practitioners must work Saturdays, Sundays and at least three or four evenings a week on regular home, hospital and office calls, not counting night emergency calls for which they must be prepared. Besides professional duties that may be neglected, the physician would have little time for relaxation and family life. This is especially true of those working above the average time, in some cases over 100 hours a week.

It was found that most physicians took between two weeks' and one month's holidays annually. Two-thirds of the solo practitioners made arrangements with other doctors to cover the practice during these and shorter periods off duty. Three of these nine members of the sample made provisional arrangements during longer periods to cover obstetrical patients.

The problem of keeping abreast with contemporary medical findings is realized by most medical doctors. The persons most affected are the general practitioners, who not only face a time constraint but also may face the fact that medical journals and conferences are becoming so specialized as to be of little practical use. It is interesting to note that time was given as the reason for moderate or

¹⁰American Association of Medical Clinics, "Professional Standards Committee Report", *Group Practice*, Vol. IX, December 1960, p. 943.

TABLE 6.4
Average Weekly Services of General Practitioners and Selected Specialty Physicians, by Field and Type of Activity, Solo Practitioners, Canada, 1962

TYPE OF ACTIVITY	G.P.	Gen- eral Surgery	Internal Med. & T.B.	Obstet- rics & Gynae- cology	Ophtha- mology & E.N.T.	Pae- dia- trics	Uro- logy
No. of doctors reporting	2542	364	278	274	284	180	51
Office calls							
% tot. patients	59.8	40.9	38.1	59.1	76.2	48.4	33.3
% tot. hours	50.3	35.3	44.8	45.1	68.8	38.2	36.5
Hospital calls							
% tot. patients	21.6	54.6	42.9	40.9	23.8	31.0	66.7
% tot. hours	19.9	48.0	25.4	38.7	21.5	21.2	50.1
Home visits, day							
% tot. patients ¹	12.6	4.5	9.5	0.0	0.0	10.3	0.0
% tot. hours	18.7	3.9	8.8	2.7	1.1	18.6	1.9
Home visits, night							
% tot. patients	3.0	0.0	0.0	0.0	0.0	3.4	0.0
% tot. hours	5.9	2.0	2.6	1.8	1.1	7.6	1.9
Teaching/research							
% tot. hours	0.6	4.9	7.0	7.2	3.2	6.8	5.8
Other activities ²							
% tot. patients	3.0	0.0	9.5	0.0	0.0	6.9	0.0
% tot. hours	4.6	4.5	11.4	4.5	4.3	7.6	3.8
Weekly number of patient visits/doctor	148	115	110	115	110	152	110
Weekly hours/doctor	50:34	44:25	49:38	48:20	40:30	51:23	45:17

¹Note that 0.0 means less than one.

²Includes such activities as clinic work, attending meetings, telephone calls, medical insurance work, etc.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, pp. 342-344.

great difficulty in keeping up with advances in medicine by 80 to 85 per cent of physicians in the sample.¹¹ Further, of those physicians who found it not particularly difficult, one half in Ontario and two-thirds in Nova Scotia were considered to be practising medicine that was not satisfactory or of doubtful quality.

In group practice, the time constraint on a physician can be greatly modified, if not eliminated, while at the same time the patient is provided with continuous care; for one member of the practice can be left on duty on a rotating basis during the night and on weekends. The patient thus has the assurance of immediate care

¹¹K. F. Clute, *op. cit.*, p. 456.

in an emergency, without feeling reticent about disturbing his physician from rest or personal engagements. This system may, of course, yield greater benefits to the physician himself, for he is able to work regular hours with scheduled time off and undisturbed vacations. Night and weekend duties can be rotated easily. When he is on duty, the physician will be well rested and presumably more effective than if he had been working a seven-day week for the past eleven months.

Time can be taken for conferences and courses which the solo practitioner would not feel able to attend. As a member of a group, the physician is able to place his practice temporarily in the hands of a colleague, knowing that it will be cared for in his absence and, recalling the fears of some solo practitioners, that it will remain intact.

At a 1963 workshop for AAMC clinics of twenty-six or more physicians, it was apparent that nearly all had provision for time off, and some had sabbatical leaves.¹²

Effective Use of Human Health Care Resources

As well as making more effective use of the physician, the group practice setting can better utilize health care personnel other than physicians. In group practice, routine tasks can be delegated to auxiliary personnel. The physician is then allowed to devote all office hours to medical problems that more closely correspond to his training.

The savings of physicians' time resulting from use of other health care personnel can be considerable. A time-motion study by Bergman, Dassel and Wedgwood¹³ on four practising solo paediatricians revealed that of the paediatrician's day, 48 per cent was spent with patients, 12.5 per cent on the telephone, and 9 per cent on paper work. Half of the time with patients was spent on well-child care and 22 per cent on children with minor respiratory ailments. Thus, an overwhelming portion of the day was spent on tasks that auxiliary personnel could be easily trained to handle, if they could not handle them with their present abilities.

R. V. Lee has suggested that each doctor should have his own personal assistant, whose training and aptitude would vary with the specialist's requirements. In the operating room such an assistant might well be more satisfactory than another surgeon because of his definite subordinate role. In any case, he could both increase the surgeon's output and reduce his fatigue from continuous strain.¹⁴

¹²American Association of Medical Clinics, "Internal Problems of Clinics", Workshop Discussion, Annual Meeting, 1963, *Group Practice*, Vol. XIV, February 1965, p. 108.

¹³W. L. Kissick, "Effective Utilization: The Critical Factor in Health Manpower" (mimeo.), 1966, p. 5.

¹⁴R. V. Lee, "Group Practice and the Crisis in Medical Manpower", *Group Practice*, Vol. XV, July 1966, pp. 491-493.

Group practice can make use of administrative personnel also. The physician is thus able to transfer a large part of his business, clerical and other administrative tasks. Efficiency is increased, not only because the physician has more time for providing additional medical care, but also because the physician is usually not trained to perform administrative tasks and may do them very poorly. Lee states that "when his (the doctor's) non-medical problems — financial, insurance, personnel procurement, physical facilities and others — are managed by non-medical people, about one third of his time is saved".¹⁵

Table 6.5 presents information on the use of personnel by physicians in solo and group practice in Canada, as revealed by the Questionnaire on the Economics of Medical Practice for the Royal Commission on Health Services. We note that our expectations are confirmed: non-physicians are much more numerous in group practice than in solo practice. Indeed, the ratio of 1.9 of such employees per physician appears to be too low; the Committee on Group Practice of the Canadian Medical Association has found that the total number of auxiliary staff is about 2.5 persons per physician.¹⁶

TABLE 6.5
Reported Number of Nurses, Technicians and Clerical Personnel Employed per Physician,¹ in Group Practice and in Solo Practice, Canada, 1960

Categories of Employees	Group Practice	Solo Practice	
		General	Specialist
Nurses	0.5	0.3	0.3
Technicians	0.4	0.05	0.07
Clerical and other	1.0	0.4	0.5
TOTAL	1.9	0.8	0.9

¹Total number of staff employed, divided by the response count.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, p. 243.

Assuming that the solo physician does hire auxiliary personnel, the problem of large factor units in relation to the size of the production unit arises. It has been estimated that for twenty-three full-time physicians in the Montefiore Medical Group, thirty-eight non-medical personnel are required, or 1.65 non-medical staff per physician. Similarly, the figure for Canadian groups is 1.9 per physician. Since we can assume that the groups, on the average, will employ approximately the appropriate number of personnel in the long run, to maximize earnings while maintaining a desired quality of care, a figure which differs significantly from 1.65 to 1.9 would show a sub-optimal personnel ratio. Now the reported number of such employees for solo practitioners is 0.8 for general practitioners and 0.9 for

¹⁵*Ibid.*, p. 491.

¹⁶Canadian Medical Association, Committee on Group Practice, draft of report (mimeo.), 1967, p. 29.

TABLE 6.6

**Estimated Annual Patient-Visit Load of Physicians in Private Practice,
and Volume of Services Rendered, Canada, 1962**

Specialty Practised	Est. No. of Services Carried out in a Std. 2000 hrs. by Phys. in Ont., 1957	Est. Ann. Pat. Visit Loads of Reporting Phys. assuming a 48 wk. working yr. Canada, 1962		Est. Ann. Exam and Specific Services performed by Reporting Phys. assuming a 49 wk. working yr. Canada, 1962	
		Solo	Partnership or Group	Solo	Partnership or Group
Anaesthesia	2295	1728	1824	1344	1824
Dermatology	5349	7676	8640	3168	4320
General surgery	3683	5520	6144	1824	2064
Neuro-surgery	3104	5520	4800	1584	1824
Orthopaedic surgery	2390	7008	7776	1824	1824
Internal Medicine	5396	5280	5952	1824	2496
Psychiatry	4229	3024	4320	2584	2584
Obstet. and gynaecology	2851	5520	6816	2736	3168
Ophthalmology and ENT	6795	5280	5712	3168	3168
Paediatrics	5046	7296	7056	4128	3408
Urology	2501	5280	5592	2064	1824
Others	5251	7104	8592-8304	2688	n. a.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, Table 5-6, p. 184.

specialists.¹⁷ The solo practitioner thus seems to have too few such personnel. In general, we can expect a given solo practitioner to have either too few or too many auxiliary personnel in total.

The situation is further complicated when we consider that the figure of 1.9 can be broken down into 0.5 nurses, 0.4 technicians, and 1.0 clerical staff per physician. It is possible for the physician to reduce the lumpiness by hiring part-time workers, but two problems arise. A half-time worker, assuming the same working conditions, would have double the efficiency loss per day's work due to inherent frictional causes, such as starting and stopping work, laying out the records

¹⁷J. A. Boan, *op. cit.*, p. 27.

of all patients for the day, and other daily duties. One nurse working full-time, even for two doctors in the same office, is more efficient than two half-time nurses. Also, really competent workers are more likely to work in full-time positions, while part-time employees tend to be not as well trained or less efficient.

The expected increase in efficiency of physicians in group practice is indicated by the data in Table 6.6. These data show the number of services rendered during a given period by physicians in solo and group practice.

In all but one comparison, that of neurosurgery, physicians in group practice had higher patient loads than those in solo practice. This increased work load may, of course, be the result of factors other than more effective use of human health care resources; more efficient use of non-human resources, for example, will yield the above result.

Not only are more paramedical personnel employed in group practice than in solo practice, but they are employed more efficiently. This results in a lower total cost per physician per employee. We present detailed data on this matter in Table 6.7.

Only in the case of clerical and other personnel are average annual costs higher per physician in group practice than in solo practice. Most likely such personnel in group practices are more highly trained.

TABLE 6.7
Average Annual Cost per Physician of Employing Paramedical Personnel in Group and Solo Practice, and Average Cost per Physician per Employee, Canada, 1960

Categories of Employees	Average Annual Cost per Phys. Reporting			Average Annual Cost per Phys. Reporting per Employee ¹		
	Group Practice	Solo Practice		Group Practice	Solo Practice	
		General	Specialist		General	Specialist
Nurses	1,740	2,470	2,610	1,974	2,071	2,169
Technicians	1,520	1,850	2,260	1,573	1,621	1,863
Clerical and Other	2,540	1,580	1,970	1,561	1,356	1,696
Total ²	5,800	5,900	6,840	5,108	5,048	5,728

¹Using the number of employees reported working per doctor on the Questionnaire on the Economics of Medical Practice weighted by the number of physicians reporting use of such personnel over the total response count.

²An approximate figure only, as population of physicians in solo practice using personnel differs between categories of personnel.

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, Table 6.14, p. 238.

The benefits resulting from increased use of paramedical personnel in group practice accrues both to consumers of health care (as we have seen, more services are available) and also to the individual physicians (see Table 6.8, on the average hourly earnings of physicians by type of practice and number of assistants).

Finally, more effective use can be made of the young physician. The waste of highly skilled productive potential usually takes place during the period that the new physician establishes his practice. It is months and often years before he can gain a sufficiently large group of patients to keep himself busy. During this period, a young physician can be an inefficient resource.

The survey conducted by the Royal Commission on Health Services in 1962 found that, of practices started since 1956, 68.6 per cent of general, 88.9 per cent of special, and 78 per cent of the total were established in this manner, rather

TABLE 6.8

Median Net Professional Income per Hour of Work of Ontario Physicians with Various Types of Practice Arrangement, 1955 or 1956

Type of Practice	Number of Physicians	Median Net hourly Income
Solo, without nursing or secretarial assistance	9	\$4.19
Solo, with nursing or secretarial assistance	19	\$5.17
Group of two, with assistance	8	\$6.09
Group of more than two, with assistance	6	\$8.17

SOURCE: S. Judek, from Questionnaire on the Economics of Medical Practice, Royal Com-
p. 194.

than by taking over an old practice or starting under contract.¹⁸ Considering the annual number of 7,104 patient visits per general practitioner and, for example, 5,280 patient visits per internist (Table 6.2, allowing for four weeks of vacation), the loss of scarce services available would equal the difference between these figures and those actually worked during the period it takes to fully establish the practice.

In addition, young doctors lacking in experience and others who are perhaps less competent can practise medicine in an environment in which, if difficulties arise, others are on hand to assist and instruct. In contrast, the isolated environment of solo practice could easily lead to a very poor quality of health care.

Effective Uses of Non-Human Health Care Resources

Just as solo practice, especially that of a general practitioner, is likely to be characterized by a less than optimal mix of human health care resources, so also is it likely to have an unsatisfactory level of non-human resources. Major equipment

¹⁸S. Judek, *op. cit.*, Table 6-23, p. 246.

is very expensive and often beyond the means of the individual. As a substitute, referral to hospital or government services, if available, leads to delays and discontinuity of care.

Without equipment in the office, physicians may fail to conduct even the most routine tests. Of the five items of laboratory work in the rating scale of Clute's interviews, four were considered satisfactorily carried out by 80 per cent of Ontario physicians under observation, while only one was satisfactory with 80 per cent of the physicians in Nova Scotia. These results are shown in Table 6.9.

TABLE 6.9
Scores of Ontario and Nova Scotia Physicians for Individual Items of Laboratory Work

Item of laboratory work	Ontario Physicians				Nova Scotia Physicians			
	Number assessed	Percentage of those assessed who were given			Number assessed	Percentage of those assessed who were given		
		No Points	Partial Points	Full Score		No Points	Partial Points	Full Score
Haemoglobin	43	18.6	—	81.4	42	42.9	—	57.1
Urine-Chemical	43	18.6	—	81.4	42	64.3	—	35.7
Urine-Microscopic	43	65.1	—	34.9	40	60.0	—	40.0
X-ray	42	9.5	—	90.5	42	16.7	—	83.3
Sterile Technique	42	9.5	7.1	83.3	41	46.3	22.0	31.7

SOURCE: K. F. Clute, *The General Practitioner*, University of Toronto Press, Toronto, 1963, p. 297.

Other tests checked by Clute and commonly neglected by physicians were examination of blood films, testing for occult blood, and examination of stools.¹⁹

Relatively elementary equipment was often lacking in the general practices observed. For example, 20 per cent of Ontario physicians had no microscope, a further 5 per cent had defective microscopes, and several other physicians used theirs infrequently. Only 62 per cent of the Nova Scotia practitioners observed had microscopes. A summary of these findings is presented in Table 6.10.

The major part of capital investment for the new physician is the physical plant itself, the office. This represents a considerable expense for the young doctor emerging from his internship; and, because of the cost, he may neglect to establish clean and efficient offices. Clute was distressed at the conditions in many offices in Ontario. Although only 66 per cent of his sample were solo practitioners, it

¹⁹K. F. Clute, *op. cit.*, p. 298.

TABLE 6.10
Major Laboratory Equipment or Facilities in Ontario and Nova Scotia
Physicians' Offices

ITEM	Ontario Number of Physicians			Nova Scotia Number of Physicians		
	With	With- out	Unknown	With	With- out	Unknown
Refrigeration facilities	30	12	2	19	20	3
Equipment for sterilization						
by boiling	42	2 ¹	—	38	4 ²	—
Autoclave	8	36	—	9	33	—
Microscope	35	8	1	26	16	—
Centrifuge	6	37	1	4	38	—
ECG machine	4	40	—	5	37	—
BMR machine	5	39	—	2	40	—
X-Ray equipment	—	34	—	—	38	—
Fluoroscopy only	3	—	—	0	—	—
Fluoroscopy and films	6 ³	—	—	4	—	—

¹Both owned autoclaves.

²Three owned autoclaves.

³One physician in each case owned and operated the equipment in a hospital.

SOURCE: K. F. Clute, *The General Practitioner*, University of Toronto Press, Toronto, 1963, p. 60.

would appear from his lengthy descriptions that solo practitioners were the worst offenders; he gives a generally favourable description of the six Ontario and ten Nova Scotia group practices.²⁰

Common use of a major portion of the physical office plant by several physicians should yield large-scale benefits. Secretarial, laboratory and waiting room space could be easily combined. A partial shift system for as few as two physicians, with one using consulting rooms while the other is on hospital or home calls, would reduce the necessity of duplication in office space. In total, if physicians can use skilled labour-saving personnel and equipment as well as complementary facilities more intensively and efficiently, considerable savings of resources could be effected.

The problem of effective use of capital equipment may be viewed in terms of the relationship between average costs of such equipment and size of practice. Most equipment is likely to have a falling cost curve, so that as utilization increases in any given period average cost falls. The larger the practice, the greater the reduction in costs.²¹ Thus lower average cost resulting from the more efficient use

²⁰K. F. Clute, *op. cit.*

²¹For a similar analysis with respect to hospital cost, see M. F. Long and P. J. Feldstein, "Economics of Hospital Systems: Peak Load & Regional Coordination", *American Economic Review*, Vol. LVII, May 1967, pp. 119-129.

of the capital should reduce the cost of health care to the patient. In any case, it does result in lower social costs. It is then another matter which group, physicians or patients, is the recipient of the resulting benefits.

When the equipment is expensive and/or when several items are considered, the difference in average cost may be considerable. An x-ray machine that stands idle 80 per cent of the time, as it might do in a solo practitioner's office, becomes far more expensive per unit of output ("health service") than one that is operating almost continuously. An example is given by a recent cost study of deep therapy equipment in an American hospital.²² The cost of the treatment room with a life of twenty-five years; the high initial cost of irradiation apparatus with a ten-year life; depreciation of the radiation source; repair, maintenance, operating costs; salaries for personnel and interest were all taken into account. The number of patients required annually to break even was computed to be sixty-four, 110 and 117 people for three machines in question. This represented 32, 34 and 63 per cent capacity, respectively. A sizable practice would be required to cover the cost of operation, and it seemed that near total capacity operation was optimal. A lower level of use would, of course, suggest the possibility of a more effective organization of resources.

One recent development which clearly suggests economies of grouping physicians is the computer. Many larger group practices and hospitals are making increasing use of electronic computers in their routine tasks. The major uses are found in billing processes, with the side benefit of producing for the physician at the end of each month a list of his professional activities by type of service and gross/net charges; this is especially important if income is distributed on a production-volume basis. The system also facilitates accounts payable analysis, and payroll.²³ A further use is the evaluation of medical records and thus the direct care of the sick. Clearly, the computer has a significant role here, for the "delivery of medical care can be defined as a primary problem of information processing; the collection, manipulation, storage, retrieval, reordering and the communication of information from one person to another".²⁴ The question that remains is whether computers at the present time have sufficient clinical value to justify their cost.

Again it is interesting to note that our expectation about more efficient use of non-human resources in group practice seems to be confirmed. The data in Table 6.11 show that depreciation allowances per physician are lower in group practice than in solo practice.

²²L. H. Deiterman, "Some Operating Costs of Deep Therapy Equipment", *Group Practice*, Vol. XVI, June 1967, pp. 417-420.

²³American Association of Medical Clinics, "Automation in the Medical Clinic: A Panel Discussion", Seventeenth Annual Session, AAMC, *Group Practice*, Vol. XVI, March 1967, pp. 177-190.

²⁴*Ibid.*, pp. 182-183.

TABLE 6.11

Average Annual Depreciation Allowance by General Practitioners and Specialists in Solo Private Practice and by Physicians in Group Practice,¹ Canada, 1960

Item ²	Group Medical Practice	Solo General Practitioners	Solo Specialists
Medical equipment	\$290	\$350	\$360
Office furniture	190	240	310
Building	340	620	690
TOTAL	\$820	\$1210	\$1360

¹For physicians reporting these figures only.

²Automobile depreciation allowances are claimed, but the figures were not available for group practice physicians.

SOURCE: J. A. Boan, *Group Practice*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1966.

Control of Quality

Our concern for quality of care in medical practice stems directly from the near absence of external pressure to ensure efficiency and quality of performance. Competition ensures this in other markets, but such a force has traditionally been considered unethical by the medical profession. Consequently the consumer encounters obstacles of no mean size when he attempts to gather information on the abilities of different physicians. Further, with health services, the use of the selection process through experience may be impossible or at least inoperative because the product may be permanent or irreversible.

Now, in solo practice, the physician may operate in comparative isolation from his colleagues. He thus must be relied upon to maintain and assure high quality. This is especially alarming when the isolation is the result of geographical factors; potential "customers" may not have a ready alternative choice! Eli Ginzberg quotes from a 1966 conference of leading medical educators: "there is substantial over-doctoring for a host of diseases, including in particular infections of the upper respiratory tract." He concludes that "the Conference certainly agreed that excessive surgery, overdoctoring and limitations in preventative medicine and rehabilitation are characteristic of the present state of medical practice".²⁵ Thus, the problem is not only the poor quality medical care that is provided, but also the wastage and maldistribution of the types of medical care provided.

The professional stimulus, found lacking in solo practice and resulting in a deterioration of quality, is present in the group setting. A physician's work is constantly under the scrutiny and advice of colleagues whose individual reputations in part depend on the maintenance of high standards in the group as a whole.

²⁵Eli Ginzberg, "Physician Shortage Reconsidered", *The New England Journal of Medicine*, Vol. CCLXXV, July 14, 1966, pp. 85-87.

A system of internal quality control can be easily established. Dr. Weinerman of the Harrick Hospital Clinics in California²⁶ lists several factors that are important if quality is to be maintained. The staff must be adaptable to cooperative practice. Although not all physicians find themselves psychologically suited to working with a team or are willing to sacrifice a certain amount of their professional independence, this problem is largely a function of education — medical education is still oriented to the solo practitioner. Moreover, control cannot be administered authoritatively but must be the responsibility of everyone, as in the voluntary group practice. Such interrelationships also help to prevent “departmentalizing”, which frequently plagues hospital and health centre programs and is contrary to the spirit and function of coordination.

The 1959 Survey of Group Practice in the United States²⁷ found that 63 per cent of all group practices, 60 per cent of the smallest practices, and over 90 per cent of the largest considered that they had effective formal methods for maintaining quality of care. Similar information for Canada is shown in Table 6.12.

TABLE 6.12
Quality of Care Procedures in Groups

	Ontario	Canada
Total number of groups	67 (100%)	246 (100%)
Member selection	64 (96%)	240 (98%)
Supervision of new members	55 (82%)	204 (83%)
Clinical conferences	33 (49%)	151 (61%)
Frequent consultations	65 (97%)	239 (97%)
Postgraduate study	62 (93%)	226 (92%)
Reference library	41 (61%)	160 (65%)

SOURCE: CMA, Report of the Committee on Group Practice, p. 26.

Group Practice and Hospital Utilization

Our concern for hospital utilization and type of practice stems from a consideration of the basic nature of the health care services which hospitals are equipped to provide. Hospitals are high-cost institutions in absolute terms. Therefore, attempts should be made to restrict their utilization to those cases that are clearly more efficiently treated in hospital than elsewhere.

If consultants and use of advanced diagnostic and treatment techniques were available without admission to hospital, there would probably be a reduction of the numbers attending hospital departments, and thus a reduction of cost with

²⁶E. R. Weinerman, “Quality Control in Group Practice Programs”, *Group Practice*, Vol. X, August 1961, pp. 585-590.

²⁷S. D. Pomrinse and M. S. Goldstein, “The 1959 Survey of Group Practice”, *American Journal of Public Health*, Vol. LI, May 1961, pp. 671-682.

beds left for serious cases. Crombie and Cross found that, depending on age group, between 12.5 and 43 per cent of all patients admitted to "medical" beds of large British general hospitals required only "hotel care", as they had no diagnostic, therapeutic or nursing requirements that could be uniquely applied in the hospital environment; 13 per cent did not need care on "strictly medical grounds".²⁸

As we have noted in Chapter 5 and as has been suggested elsewhere,²⁹ insurance coverage for a large proportion of the population represents a great hazard; for there is then the incentive to have health services provided in the hospital setting where they are so insured, rather than elsewhere, even though they might be provided elsewhere at lower cost to society. In two New Orleans hospitals observed by a local physician³⁰ on a given day, 60 per cent were in for diagnosis or therapeutic procedures which did not require a hospital stay, or were there "purely because they were on leave from work and had insurance coverage". It was felt that the increases in costs were about 90 per cent in the laboratory department, 175 per cent in radiology, 50 per cent in the pharmacy, and 545 per cent in personnel.³¹ Similarly, Dr. Sheps of the University of Pittsburgh³² estimated that about 15 per cent of all hospital days of care were unnecessary because the patient had reached the stage where he would be better at home. U.S. National Health Survey data for 1958-1960 show that more than a quarter of total hospital days for patients discharged from acute general hospitals represented stays of more than one month. The patient and society is paying heavily for such stays, and it is clear that if an organized home care program centred around a hospital outpatient department group practice can do part of the job adequately, large-scale saving will accrue.

Although supposedly working on his own, the solo physician does require assistance from the rest of the medical care team situated within the walls of the hospital. He expects it to provide 1) diagnostic facilities required for complex investigations; 2) outpatient and inpatient consultations when he is unable to make or ensure an accurate diagnosis; 3) treatment and care beyond the means of the physician at the office or in the home; 4) a meeting place for the local medical profession to exchange ideas and a continuing environment for postgraduate education.

In contrast to this obvious need of complementary hospital facilities, actual practice suggests there is a problem concerning hospital privileges. A current and

²⁸D. L. Crombie and K. W. Cross, "The Relationship of Hospital and Domiciliary Care", *Medical Care*, Vol. I, October-December 1963, pp. 245, 248-250.

²⁹American Association of Medical Clinics, "Can Good Health Care be Provided More Economically", a Panel Discussion, Fifteenth Annual Session, AAMC, *Group Practice*, Vol. XIV, March 1965, pp. 163-173.

³⁰*Ibid.*, p. 165.

³¹*Ibid.*

³²*Ibid.*, p. 167.

increasing complaint among private physicians is that access to hospital facilities for their patients and themselves is either forbidden or severely restricted. These physicians find it increasingly difficult, especially in teaching hospitals, to obtain beds for their patients unless they hold staff positions. The alternative open to the patient is to place himself under the direct care of either a physician who is a resident physician or one who has a hospital appointment. To the extent that this situation occurs, some physicians will be providing on an ambulatory basis medical care that should best be provided in hospitals, and others will be tempted to use hospital facilities when care could be more efficiently be provided on an ambulatory basis.

That solo practitioners are unhappy about the availability of hospital facilities is not clear. Dr. Clute found that in Nova Scotia, most general practitioners (62 per cent of all physicians asked) were satisfied with the availability of hospital services in meeting their needs. When asked if they were satisfied with the limitations placed on them by the hospital standards regulations, 45 per cent said that they were subject to no restrictions, 45 per cent said they were limited but were satisfied with the limitations, and the residual were dissatisfied. All but one of the forty-two doctors questioned felt they had sufficient access to hospitals. For example, although only physicians certificated in surgery had full surgical privileges, many physicians felt that this was a legitimate restriction in order to maintain standards and protect the patients.

More recent developments in Canada, however, suggest that there has been a reversal in attitude. Dr. Harvey Tonken, a Canadian general practitioner, viewed the situation with alarm early in 1965 in a letter to the *Canadian Medical Association Journal*:

Except in the smaller town and a few small cities the general practitioner is losing his place in the hospital. In one small city in this province (Ontario), general practitioners have been informed that they will not be allowed to do simple tonsils and adenoids in the future. In many hospitals, general practitioners are not allowed to perform D and C's let alone procedures that may be slightly more complicated. A private census taken in one of the larger cities of Canada showed that the average general practitioner was getting no more than two beds a month. Many hospitals in North America do not allow a general practitioner through their doors.³³

In contrast to general practitioners in solo practice, those in groups, although not necessarily having better hospital privileges, would seem to have two advantages. Through the facilities available in group practice clinics for extensive diagnostic and treatment procedures, as well as minor surgical operations that can be done on an ambulatory basis, they can circumvent the necessity of sending a patient to hospital in many instances. Second, for more serious cases, they can

³³Harvey Tonken, "The General Practitioner in a Changing World", A Letter to the Editor, *Canadian Medical Association Journal*, Vol. XCII, January 23, 1965, pp. 191-192.

rely on the services of a fellow member of the group who is a specialist in a field and who has hospital privileges, if not a hospital appointment.

Our expectations about the use of hospitals by physicians in group practice and those in solo practice are as follows. In that group practice physicians are able to purchase capital equipment for carrying out diagnostic procedures that otherwise would have to be carried out in hospital, we expect a physician in group practice to make less use of the hospital. This, of course, may not be the least-cost method of providing care. It may well be that the housing of large-scale non-human health care resources in a central hospital is more efficient than the same resources being scattered among several group practices. Just as it is highly likely that group practice would make more efficient use of capital equipment than would a solo practitioner, so also is it clear that the hospital represents an environment in which capital equipment could well be used more efficiently than in group practice because of the larger number of users. If this were the case, then the observation that solo practitioners made more use of hospital facilities than physicians in group practice would have to be interpreted carefully.

Data describing the use of hospitals by physicians, classified by type of practice, yield mixed results. Data for the Kaiser Foundation Plan in California show much reduced use of hospitals by their physicians who practise in groups (see Chapter 4). This observation however, must be interpreted in light of the knowledge that the very organization of the Kaiser Plan, with its built-in incentives for the physician to provide a given quality of service at least cost, will prevent excessive use of hospitalization. If a particular patient whose need for health care does not justify hospitalization is nevertheless hospitalized, the physician receives a lower income. In short, the Kaiser Plan is set up in such a way as to motivate physicians to provide a given quality of care at least cost. That the quality of care thus provided is of as high a quality as that provided by other physicians in California is ensured by the demand of consumers. If quality of care falls, consumers will take their demands for health care to other plans or to other physicians. Its steadily increasing membership suggests that the Kaiser Plan has been successful.

Information on hospital use by physicians in the Sault Ste. Marie and District Group Health Foundation suggests that group practice results in a substantial reduction in hospital use. "In 1964, for example, the number of admissions per thousand population, and the number of days of care per thousand population for the Group Health Centre were 95 and 680, as compared to 136 and 1,497 for the Sault Ste. Marie region at large."³⁴

Since 1955, several studies have shown lower hospital use by subscribers to prepaid group practice plans, the differential of about 20 per cent being attributed

³⁴Sault Ste. Marie and District Group Health Foundation, Submission to the Committee on the Healing Arts, August 1967.

TABLE 6.13

Non-maternity Inpatient Hospitalization Experience, Selected Health Insurance Plans, Federal Employees Benefit Program, November 1, 1961-October 31, 1962, U.S.A.

Plan	Average No. Covered (thousands)	Admission per 1,000 persons per year	Days per Admission	Days per 1,000 persons per year
Total	5831.5	92	8.3	763
Blue Cross-Blue Shield	3202.0	99	8.4	826
Indemnity Benefit Plans	1357.2	78	9.1	708
Employee Organization Plans	923.0	98	7.4	729
Individual Practice Plans	106.7	98	5.5	538
Group Practice Plans	242.6	57	7.9	454

SOURCE: W. Shapiro, "Research in Prepaid Group Practice Programs", *American Journal of Public Health*, Vol. LIV, December 1964, p. 2043.

mainly to the reduced rate of hospital admissions.³⁵ Shapiro's study shows the lower use of hospitals by group plan members than those belonging to commercial insurance plans (see especially Table 6.13).

Dr. T. S. Neiman of the Bridge Clinic in Seattle gives five reasons for their reduction in hospitalization:³⁶

- 1) The group practice physician knows his patients and their socio-economic environment; thus he gains their confidence, so that they can be treated on an ambulatory basis, accepting the doctor's decision on hospitalization requirements.
- 2) He has adequate diagnostic and therapeutic facilities to provide patients with many services that might otherwise be available only through hospitalization.
- 3) Since he is more easily accessible — or at least one group member can always be reached — the necessity of hospitalization for complete and continuous care is reduced.
- 4) He is more apt to use specialists judiciously than to leave it to the patient to go on his own to a solo specialist who hospitalizes more frequently.
- 5) The group practice physician has no financial or "professional" incentive to hospitalize.

As we have noted, the fifth point is probably directly related to the third.

³⁵Herbert E. Klarman, *The Economics of Health*, Columbia University Press, New York, 1965, p. 130.

³⁶T. S. Neiman, "The General Practitioner in Prepaid Group Practice Plans", *American Journal of Public Health*, Vol. LIII, October 1963, pp. 1635-1643.

In the situation in which there is no incentive for physicians to use hospitals rather than their own clinics for patients not requiring hospitalization — that is, if there were not hospital insurance alone, or if there were both it and also insurance covering other health needs — we would expect physicians in group practice to make much less use of hospitals than those in solo practice. This statement again begs the question of which pattern of the placement of capital equipment is most efficient.

Size of Health Care Facility, Transportation Costs, and Social Costs

A frequent criticism of the larger group practice concerns the centralization of physicians who might otherwise cover a wide area, especially if there are more than one or two of each specialty in a single practice. Evidently, if people are to gain the many advantages of scale and consolidation, something must be sacrificed — in this case, the location of the physicians concerned over a wide geographical area, particularly in less urbanized districts. The essential question, “Is the requirement that patients possibly travel farther to a group practice location either theoretically or practically a net disadvantage?” must be answered. Up to a certain point the guide to maximum social benefit is “to bring the patient to the physician, not the physician to the patient”.³⁷ Purely on the basis of relative cost, patients’ travel time (including such “non-earners” as housewives and children) has been valued in the range of \$1.55 to \$2.80 an hour.³⁸ On the other hand, the physician’s net income per hour some ten years earlier ranged between \$4.19 and \$8.17 for general practitioners.

Similar inefficiencies exist when not only the physician, but the patient as well, must travel to hospital from the doctor’s office (either directly or indirectly, as with the patient who may go at a later date) for a health service which might have been provided at less cost in the physician’s clinic. In addition to these costs, there may be a significant lag in time taken for treatment with resulting medical and economic costs.

Group practice could help to minimize such wastage, particularly with respect to those services which are repeated many times a week, and to make facilities in the clinic economically justifiable. Possibly group practices could be more often situated in or near a hospital, in which case the physician should request patients to use facilities of that rather than other institutions in the area.

Finally, it may be asked whether a mile or so farther in the city or a few miles in the country make much difference to the average patient. Most people use their automobiles or travel by bus the half mile or more that they travel to see their

³⁷L. E. Beaton, *op. cit.*, p. 43.

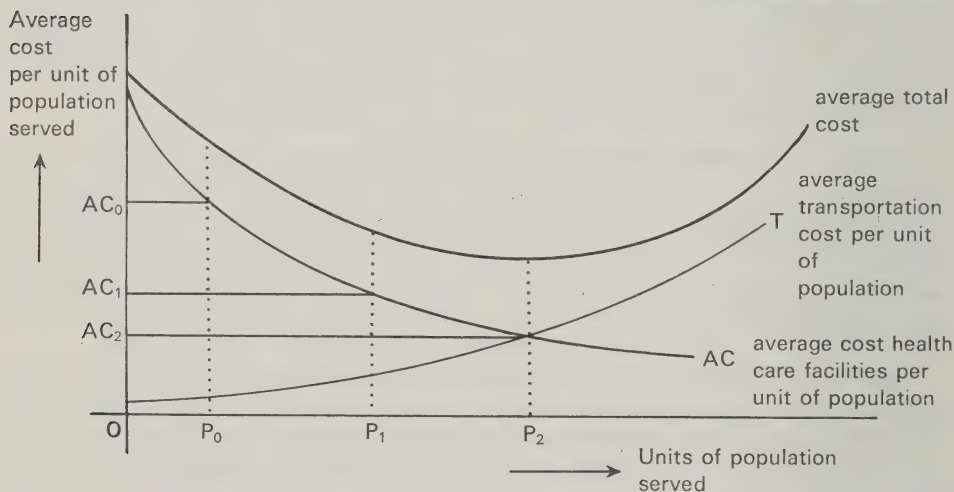
³⁸M. F. Long and P. J. Feldstein, *op. cit.*, p. 126.

local general practitioner, or even farther perhaps to a specialist. In addition, probably a significant number of people do not visit the physician nearest to their residence but are willing to travel a little farther to see a specific physician of their choice. Hence, distance within certain limits is perhaps only a minor consideration today.

Additional travelling time is saved at the clinic, moreover, by the consolidation of laboratories, specialists in several fields, and possibly even a dispensary. Thus, since all normal requirements can be met in the one location several trips to different offices are eliminated. On the whole, therefore, it seems likely that the centralization of physicians in group practice would yield savings in the direct cost of travel and in the travelling time of both physician and patient.

We might now look at this problem of transportation costs and size of facility in more general terms. The relationship between size of health care facility (in terms of the size of the population covered) and average cost per individual covered is most likely downward sloping, as shown by the curve AC in Figure 6.1. For example, given P_0 as the size of population to be covered, AC_0 would represent cost per person.

Figure 6.1. Size of plant (hospital or clinic) and transportation costs



It is also possible that some size of population, such as P_0 , corresponds to the average number of patients consulting a single solo practitioner and that the average cost of providing a given level of care is AC_0 . Similarly, some point P_1 , for example, may represent the population that could be covered by a group practice or clinic with an average cost of AC_1 ; and a size of population P_2 or greater with an average cost AC_2 or less may characterize a hospital clinic. Note

that the average cost curve is constructed on the assumption that the same level of care is being given in solo practice, group practice, and a hospital outpatient department. It is not necessary to argue just where solo and group practices are located; we want only to illustrate the fact that for a given level of care, the average cost of providing that care will fall as the number of persons covered increases. This is because of the economies associated with use of non-human health care resources, and the specialization and division of labour with respect to health care personnel.

The other major element in the determination of real resource use in the provision of health care is the cost of transportation. Consumers of health care travel to the health care facility and, in turn, health care personnel travel to the homes of patients for emergencies.

Obviously the relationship between transportation costs and size of population covered will depend on the density of the population. For an urban centre, transportation costs might be represented by the curve T, or by some curve below T and to the right. On the other hand, for a rural area, the curve describing the relationship between average transportation cost and size of population covered would most likely lie above T and to the left.

For any given density of population and corresponding transportation cost function, there will be some size of health care facility (and population) that represents minimum social costs for the provision of the given level of health care. This point is found by adding vertically average cost of the health care facility and average transportation cost. The result is an average total-cost curve that has a minimum point. In our diagram this point is P_2 . The determination of such points in practice would require considerable trial-and-error work.

Our preceding discussion of group practice and solo practice offers a great deal of information in support of the expected inverse relationship between size of practice and average patient cost. If we add to this information data about densities of population, it seems clear that, on these technical grounds, group practice and hospital outpatient departments represent a more efficient use of resources than does solo practice for most communities in Ontario and Canada.

Side Effects of Group Practice

Two unfortunate effects on interprofessional relationships result from the characteristics of group practice organization. These are not inherent, however, and depend largely on the personalities of the physicians and the attitudes of the groups concerned. There is a danger that among several physicians who are a team, yet in a sense are competing for their share in the proceeds, a certain amount of friction might develop. For example, the problems of establishing a distribution pattern for income and then having to weigh such factors as productivity in terms of services rendered, professional status, importance of specialty, length of mem-

bership, and legal status within the group, are all potential trouble spots; they can all initiate competition within the group. If possible, an equitable formula and other rules should be established at the outset of group practice.

Similarly, difficulties may arise in the utilization of pooled capital funds and any net residual income of the group. Having a business manager is undoubtedly profitable for most groups.

Professional friction can arise also whenever the opinions of two or more physicians do not agree; in certain cases members may not be willing to compromise. A professional management board could be formed to deal with any such clashes that are serious. Each member may find himself having to submit to a group decision of which he does not approve. However, interpersonal conflict is present in any social group and many are able to continue functioning effectively.

It is infrequent that differences between members of the organization cannot be reconciled for the achievement of their mutual goals, and that the existence of the organization is threatened. Of the seven medical groups in the Los Angeles-California area which failed in the twenty years following 1946, five have been studied in detail. D. M. du Bois discusses these in a recent paper.³⁹ On close study, interpersonal problems were found to result from basic organizational faults. This suggests the "functional importance of organizational objectives as a basis for control or resolution of interpersonal conflicts", in terms of social rather than individual interest. The organizational structure should thus contain a provision for the settling of any conflicts that might arise. On the basis of his observations, Du Bois concluded that organizational viability seemed to be a function of the "kinds of objectives around which the organization is formed and operated".⁴⁰

Finally, a potentially serious disadvantage lies in the relationship between clinic and non-member physicians in the surrounding area. "Outside" physicians might not send a patient who could use the services to a group practice, because they might lose him to the closed circle of group members. In reverse, group loyalty may result in group members being reluctant to send patients to outside specialists, even though they are more competent or have a subspecialty corresponding to a patient's needs.

Such problems are ethical in nature and concern interpersonal relations. They can be overcome by lenient attitudes and by a primary concern for the patient. Intergroup and group-non-group physician friction seems a minor problem when considering the vast advantages in cost and general quality of care to the medical services consumer through this form of giving medical care.

³⁹D. M. du Bois, "Organizational Viability of Group Practice", *Group Practice*, Vol. XVI, April 1967.

⁴⁰*Ibid.*, p. 269.

Conclusion

In the discussion of group practice, the many generalizations made should be viewed with caution. The impression must not be left that, because group practitioners are in an environment which allows greater efficiency, quality and availability of care, solo practitioners are in general negligent or inferior physicians. Some provide very good care, but at relatively high cost to society; many others give their patients good care, but care that is sharply limited by the extent of their economic and technical resources. The same physicians could undoubtedly increase their efficiency and the quality of medical care they provide through the group type of organization.

On the other hand, not all group doctors give exemplary service and some must rely on other members of the team for assistance. It is held, however, that these physicians are less dangerous in providing health care in the group setting than they would be in solo practice.

Other factors which must be taken into consideration are geographic and demographic influences. The ready availability of a consultant service within the group is more important in smaller centres where there are fewer specialists within a given area than in the large cities, and where the group members are not closely associated with the large staff of a city hospital.

Canada seems to be facing a severe shortage of health care resources. Due to increases in medical knowledge, specialization, and sophistication of equipment, there has been an increase in the level of health and medical care standards. This has been accompanied by an increase in public awareness of need. Greater demand has led to an imbalance between supply and demand. This imbalance will become much more acute if a national medical care scheme guaranteeing even minimal levels of care for all is introduced.

Thus, we are led to the attempt to provide medical services as efficiently as possible. It appears that, in order to do this while maintaining or, indeed increasing, the quality of care, and to ensure that health care is within both the economic and the geographical reach of the entire population, the medical care industry must be reorganized. One form of organization, already shown to be effective, is group practice.

Many of the problems which beset solo practice are overcome in the group setting. Among these problems are the following: fragmentation of care and its implications, largely the result of specialization; inadequacy of care due to lack of consultation, professional distrust, inadequate capital resources required for sophisticated modern processes, and hence a problem of delayed diagnosis or treatment, or omission of the process altogether; wastage of resources, if they are owned by the physician, due to sub-optimum plant size; the inability or lack of

incentive to continually revise one's medical knowledge and techniques through study, alone or in postgraduate courses and conferences; possible incompetence of the practitioner himself; and, finally, the solo practitioner's long hours of work.

Not only are the direct costs per unit of medical service reduced in group practice through the advantages of teamwork and economies of scale, but also indirect costs to the patient are eliminated or substantially reduced. The physician, one of the principal health care resources, is more efficiently employed as a result of the consolidation of many medical services in one location, and through the more optimal use of paramedical personnel and technical equipment.

An estimate of the increased efficiency of group over solo practice is indicated by information on the several specific financial advantages to the physician. The average net income of all private practitioners in Canada, 1960, was \$13,820 for general practitioners and \$18,730 for specialists. Although these figures are greater than those for salaried medical employment, physicians organized in group practices had higher incomes, averaging \$19,420 and varying with the size of the group (see Table 6.14).

TABLE 6.14

Average Total Net Income of Physicians in Solo and Group Practice, and Number of Practices/Physicians by Size of Group, Canada, 1960

Number of Physicians in Group	Number of Practices/ Physicians Responding	Average Net Income
Solo general practice	1600/1600	13,690
Solo specialist	1221/1221	19,500
Subtotal	2821/2821	16,205
Group with 3 physicians	90/270	18,490
4	33/132	17,710
5	21/105	18,430
6	13/78	19,460
7	10/70	15,480
8	3/24	18,500
9	4/36	17,860
10	2/20	28,510
10+	16/301	21,910
Subtotal	192/1,036	19,420

SOURCE: S. Judek, from the Questionnaire on the Economics of Medical Practice, Royal Commission on Health Services, Queen's Printer, Ottawa, 1962, pp. 223, 364.

It would appear from these data that, although groups with ten or more physicians are rare compared with the total number of physicians, they yield the highest average annual incomes. Explanations of this stem from the economies of scale associated with the use of paramedical personnel and equipment. Although group physicians sometimes tend to work longer hours due to the increased number of patients,⁴¹ the gain in total income is sufficient to result in a gain in income per hour worked.

That physicians still opt for solo practice is somewhat difficult to explain. If group practice offers not only higher financial rewards, but also more leisure time, and in addition seems to provide the patient with a higher quality of care than solo practice, it is interesting that more practitioners do not opt for group practice. One of the reasons for the slow transformation to the new forms of group practice may be "that medical education does not prepare the graduate for working in close association with his colleagues and that he fears interference with the way he runs his practice and conducts his business".⁴² Another reason is the often-expounded value of being "one's own boss". In that it is a question of the education a physician receives, there would seem to be few objections to reorienting the educational process in the direction of training physicians for a working life in the group setting.

Although group practice can provide comprehensive care by specialists in one location and can take advantage of various automated procedures, this type of organization is ideally suited to personal family care spear-headed by a personal physician, often an internist or general practitioner, within the group. At the same time, the general practitioner, who may well be vital to highest quality care, finds a new role and renewed stature in the era of specialization.

Initial travelling to a group practice clinic may well be greater due to the necessity of centralizing several solo practices. It is held, however, that this disadvantage is negligible in light of modern transportation patterns. On the other hand, considerable savings of physician's time and a reduction in the number of second visits may more than offset the increased travelling on the first visit.

The argument against the establishment of group practices, namely that single physicians obtain the same advantages through their associations with hospitals, seems to be refuted by observation of solo physicians. In addition, there is a reduction in hospital utilization if ambulatory care now provided in the hospital setting is transferred to the group practice clinic.

It should be noted also that the economies-of-scale principle suggests that hospital clinics can operate even more efficiently than group practices. It seems likely that some combination of group practices located physically apart from the

⁴¹S. Judek, *op cit.*, Appendix 5-2, p. 344.

⁴²Robert Kohn, *Emerging Patterns in Health Care*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965.

hospitals and of hospital outpatient clinics would be optimal for providing family health care. Both should be organized so as to reduce hospital use. Disadvantages of outpatient departments, such as impersonal service, discontinuity of care and excessive waiting, can be circumvented.

The case for encouraging the development of group practice, either as a hospital outpatient department or as a clinic geographically apart from the hospital, seems well established.

Chapter 7 Child Dental Care: Dental Health Nurse Versus Dentist

Introduction

The problem to which this chapter is addressed is the efficiency of the allocation of manpower resources in Ontario for the provision of dental care. In particular, we want to know if the institutional framework of licensing procedures and accompanying regulations and educational requirements might be altered, and thereby made more effective, by permitting training of and practice by "dental health nurses". Our analysis is not comprehensive; rather, it illustrates a method of analysis. In so doing, it draws attention to the complications involved in setting out an "optimal" solution to the problem.

The investigation has been narrowed considerably. We look only at the care of dental caries¹ for preschool and school-aged children. We consider the costs of providing only one level of care, universal coverage, without discussing whether this is the most desirable level for Ontario. Finally, we consider only two possible alternative types of personnel for the provision of this service: the dentist; and the dental health nurse, modelled after the type of personnel of the same name that work in New Zealand.

There are several alternative ways of providing the increased amount of dental health care implied by universal coverage:

- 1) Increase the number of dentists and increase the quality of the graduate dentist by adding one year to the present course of study.
- 2) Increase the number of dentists while maintaining the present four-year program.
- 3) Increase the number of dental hygienists and
 - a) have them perform their present functions;
 - b) grant them more responsibilities.
- 4) Upgrade the course for dental hygienists from two to three years, grant them a B.Sc. and enlarge their responsibilities.

¹In its Brief to the Royal Commission on Health Services, the Canadian Dental Association lists four other major types of dental disease: periodontal, malocclusion, congenital and developmental anomalies, and lesions requiring surgical treatment. See Canadian Dental Association, Brief to the Royal Commission on Health Services, March 1962, Appendix I, p. 1.

- 5) Increase the course content for and responsibilities of dental technicians and assistants.
- 6) Create a new profession comparable to the dental health nurse in New Zealand to look after some of the clinical and educational functions of dentistry.
- 7) Create a group of dental care personnel similar to the RCDC's clinical supervisor, who is a combination of a dental hygienist and a dental health nurse.²
- 8) Introduce a system of large clinics similar to that found in Russia, wherein a senior dentist carries out the initial examination, prescribes the treatment, and supervises other personnel in the clinic while they perform the work required; these other personnel may or may not be fully trained dentists.³

Not all of these alternatives are mutually exclusive. To find the most efficient alternative, the decision-maker must consider the following three questions: for a given level of required service,

- 1) Are the responsibilities between the dentists and the auxiliary personnel divided in the most efficient manner?
- 2) Related to 1), is the institutional framework in the optimal form (that is, are the regulations and licensing procedures in accord with the optimal division of responsibilities)?
- 3) Are the educational institutions properly preparing students to work efficiently as providers of dental care?

Since we chose to consider the alternatives of training more dentists and of training dental health nurses, we can focus attention on the usefulness of dental nurses in Canada.

Our plan is to define briefly dental caries and their causes, to estimate the size of the population in need of care, to set out in detail the alternative methods of attacking dental caries and related job functions, and finally to outline the costs of using each of dentists and dental health nurses for the care of dental caries in preschool and school-aged children.

Dental Caries

Caries are holes in the teeth caused by decay.

Caries begin on the exterior tooth surface exposed to the oral cavity as a microscopic lesion which enlarges and deepens until the lesion, if untreated,

²K. M. Baird, G. R. Covey, and D. H. Protheroe, "Employment of Auxiliary Clinical Personnel in the Royal Canadian Dental Corps", *Journal of the Canadian Dental Association*, Vol. XXIII, No. 4, April 1967, pp. 184-191.

³R. A. Connor, "World-wide Developments in Dental Health Programs", *Canadian Journal of Public Health*, Vol. LVI, No. 12, December 1965, p. 503.

penetrates to the inner pulp. At the time the pulp is being affected acute pain is usually suffered and subsequently the pulp tissue becomes necrotic. The pulpal infection in time spreads into the supporting bone causing an abscess which remains as a chronic infection until either the tooth is removed or endodontic treatment is performed.⁴

The danger to the whole body of serious and prolonged infection in the mouth cannot be overemphasized. The interaction of sugar (carbohydrate substrate) and dental plaque bacteria forms an acid which attacks the enamel of the teeth.⁵ The acute pain that occurs once the disease reaches the pulp will cripple the mouth and make it difficult for a person to chew. This will cause masticatory malfunctioning, which could lead to such further complications as indigestion, malnutrition and gastro-intestinal upsets. The sequels to these are even more serious. The continuing presence of untreated disease will eventually lead to loss of teeth. In addition, the accompanying physical disfigurement can drastically affect the individual's psychological and economic well-being.

In children, unless space maintainers are installed, the premature loss of deciduous teeth allows the remaining teeth to shift; this makes it difficult for the permanent teeth to emerge normally. Further, without a full complement of teeth, a child's dental arch can shrink; this in turn hinders the normal eruption of the permanent teeth. Thus, control of caries is an important preventive measure for malocclusion.⁶

There are several measures of the prevalence and incidence of dental caries. One is the percentage of children who are caries free; another is the percentage that have one or more teeth affected by caries; a third is the percentage of children who, because of caries, have lost one or more teeth; and finally, a fourth is the "def." and/or "DMF" per child. Def. stands for the average number of decayed, prematurely missing, or filled *deciduous* (first) teeth per child; DMF stands for the average number of decayed (D), missing (M) or filled (F) *permanent* teeth.⁷ Actual estimates of each of these measures usually come from studies of a small sample of the child population.

⁴Canadian Dental Association, Brief to the Royal Commission on Health Services, *op cit.*, Appendix I, p. 1.

⁵W. H. Hill, "Fluoridation of Water", A Letter to the Editor, *The Canadian Journal of Public Health*, Vol. XLIII, 1952, p. 320; J. Kreutzner, "Review of the Developments in Preventive Dentistry", *Journal of the Canadian Dental Association*, Vol. XXXII, No. 12, December 1966, p. 697; R. A. Clappison, "Preventive Dentistry in General Practice", *ibid.*, p. 707.

⁶G. H. Sperber, "Inter-relationship of Oral and General Health", *Canadian Journal of Public Health*, Vol. LVI, No. 11, November 1965, p. 462; L. M. Waugh, "Care of the Deciduous Teeth as a Basis of Occlusion of the Permanent Dentition", *Journal of the Canadian Dental Association*, Vol. XXI, No. 2, February 1955, pp. 75-89.

⁷D. W. Lewis, G. T. Mitton, and R. M. Grainger, "Dental Health of Ontario Children", *Journal of the Ontario Dental Association*, Vol. 44, No. 2, February 1967, pp. 14-19; Vol. 44, No. 3, March 1967, pp. 18-24; Vol. 44, No. 4, April 1967, pp. 16-22.

TABLE 7.1
Average DMF and def. Rates in the Ontario Children's Survey, 1961-1964

Age	def.	def.	DMF	DMF	DMF + def.	DMF + def.
5	4.48		0.10		4.58	
7	5.64	+ 1.16	1.39	+ 1.29	7.03	+ 2.45
9	5.25	- 0.39	2.71	+ 1.32	7.96	+ 0.93
11	1.84	- 2.41	4.06	+ 1.35	5.90	- 2.06
13	0.23	- 1.61	6.17	+ 2.11	6.39	+ 0.49
5-13					6.36	
combined	3.60	—	2.76	—		—

SOURCE: D. W. Lewis, G. T. Mitton, and R. M. Grainger, "Dental Health of Ontario Children", *Journal of the Ontario Dental Association*, Vol. 44, No. 4, April 1967, p. 20.

TABLE 7.2
Sample Size of Ontario Children's Survey, 1961-1964

Age:	5	7	9	11	13	Total
Sample	309	372	368	371	350	1,770

SOURCE: D. W. Lewis, G. T. Mitton and R. M. Grainger, "Dental Health of Ontario Children", *Journal of the Ontario Dental Association*, Vol. 44, No. 4, April 1967, Table 1, p. 24.

The results of a study undertaken by D. W. Lewis, G. T. Mitton and R. M. Grainger in Ontario are presented in Table 7.1.

The sample, as shown by the data of Table 7.2, consisted of over 1,700 school children aged five to thirteen years. The study was carried out over the period of three academic years, 1961-1964. The sample was drawn up so as to be reasonably representative of the entire child population of Ontario.⁸

Table 7.3 shows the results of a similar study undertaken in early 1964 by Gray and Hawk for children under the age of five in Penticton, B.C.⁹

TABLE 7.3
Children's Survey in Penticton, B.C., 1964

Age	def.	def.
3	1.69	1.8
4	3.5	1.3
5	4.84	

Note: Size of sample is 610.

SOURCE: A. S. Gray and D. R. Hawk, "Significance of Caries Experience in Per-School Children, Aged 3-5", *Journal of the Canadian Dental Association*, Vol. XXXIII, No. 2, February 1967, p. 87.

⁸*Ibid.*, Appendix 11, 12, 13.

⁹A. S. Gray and D. R. Hawk, "Significance of Caries Experience in Pre-school Children, Aged 3-5", *Journal of the Canadian Dental Association*, Vol. XXXIII, No. 2, February 1967, p. 87.

Size of Population in Need of Care

An estimate of the population in need of care for any one year would involve projecting the population for each age and multiplying it by the incidence of caries for each age. The total estimated number of caries for any one year could then be determined by summing the estimates for each age group. We are considering projected need over a nine-year period; therefore the process would have to be repeated nine times. This would be a fairly large task, and the results might not be accurate enough to warrant the costs of making the estimates. We would have to make use of projected population estimates; and most available incidence rates relate to sample groups, for odd years of age only.

To simplify our problem we decided to accept the CDA's estimate of 1.9 for the average incidence of caries for children from birth to fourteen years of age¹⁰ and to compute the total need for each year by multiplying that figure, 1.9, by the entire projected population from birth to sixteen years of age for each year, 1971 through 1979. The results of this computation are shown in Table 7.4.

TABLE 7.4
Estimated Total Number of New Caries for Children 0-16 years,
Ontario, 1971-1979

Year	Population	Incidence	Estimated Total No. of New Caries
1970	2,528,300	1.9	4,803.770
1971	2,550,191	1.9	4,845.363
1972	2,572,977	1.9	4,888.656
1973	2,597,049	1.9	4,934.393
1974	2,622,596	1.9	4,982.932
1975	2,645,399	1.9	5,026.258
1976	2,666,421	1.9	5,066.120
1977	2,690,022	1.9	5,111.042
1978	2,715,019	1.9	5,158.536
1979	2,744,711	1.9	5,214.951

SOURCE: Economic Council of Canada, Population Projections; and Canadian Dental Association, Brief to the Royal Commission on Health Services, March 1962.

At the start of a program of universal care, there will presumably be a large backlog of untreated caries. After the plan has been in operation for several years, this should not be a factor, for all caries will be treated in the year that they occur. There would, of course, have to be some allowance for children who enter the province from a province or a country which does not have universal care; they are bound to have some untreated caries over and above the annual incidence rate.

¹⁰Canadian Dental Association, Brief to the Royal Commission on Health Services, *op cit.*, Appendix III, p. 3.

Controlling Dental Caries

The three general approaches to controlling caries are treatment, prevention and public education. We will evaluate the various component parts of each of these.

In the article, "Relative Value Method of Fee Determination",¹¹ R. A. Clappison, W. W. Pressey and R. C. Freeman attempt to determine the relative value of the various services performed by a dentist. They claim that the relative value of any service is a function of "... the time required for rendering the service, the degree of responsibility involved, laboratory costs, the technique employed, office overhead, cost of materials used and patient difficulty encountered".¹² Once this relative value is determined, an equitable charge can be levied for each service. The authors decided to assign a unit weight of one to a particular service and then give all other services an approximate weighting relative to this basic service. They chose as the basic service an occlusal amalgam restoration in a bicuspid, for it met the four criteria they thought a basic service should have: namely, 1) it is provided by the average practitioner for the average patient; 2) it is simple (unaccompanied by complications); 3) it is frequently performed; and 4) it has a limited variation of techniques.¹³

Of the determinants of the Relative Value Unit (R.V.U.), the authors decided to choose "... only those components which appeared to be significant, objective, measurable and compatible with simplicity".¹⁴ Hence, they decided to have only responsibility (R) — defined as "... the knowledge, judgement, skill and clinical and technical risk connected with the service"¹⁵ — and time (T) as components of R.V.U. (that is, $R \times T = R.V.U.$). Time was to be allocated into fifteen-minute periods. The three general approaches to controlling dental caries and related job functions are set out in terms of these R.V.U.'s.

Treatment

Treatment is simply treating the disease once it has been discovered. This is the part of dentistry that is most recognized by the public and by the members of the profession itself; and to the ostensible chagrin of most of the leading and progressive members of the profession, treatment is the area to which most of the dental manpower resources are presently directed. However, it is necessarily so; the state of dental health of the community is so bad that the dentists have little time for either of the other two areas! The irony is that unless these two areas

¹¹R. A. Clappison, W. W. Pressey, and R. C. Freeman, "Relative Value Method of Fee Determination", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 12, December 1965, pp. 763-778.

¹²*Ibid.*, p. 774.

¹³*Ibid.*, p. 765.

¹⁴*Ibid.*

¹⁵*Ibid.*

are attended to, the chances of progress in dental health for the community as a whole are small.¹⁶

To treat a patient for dental caries, there are three basic groups of services. First, there must be examination and diagnosis, then the treatment services themselves, and finally the post-treatment services. In addition, the dental care personnel should be sufficiently skilled to be able to deal with any emergency which might occur during the course of a regular day. Prognosis is usually a choice between filling, endodontic treatment, or extraction with space maintainers installed if necessary.

If the caries are treated early (before pulp involvement) the procedure generally is, first, removal of the affected tooth tissue with cutting instruments and, second, restoration by one of several methods, depending upon the degree to which the tooth has been destroyed and the position of the lesion in the mouth. If the caries have penetrated the dentine and are approaching the pulp, a protective barrier of chemically inert non-thermal conducting material is added to protect the pulp. When the dental pulp is infected or abscessed, the process is 1) complete removal of the necrotic pulp from the tooth; 2) sterilization of the pulp chamber; 3) complete obliteration of the pulp chamber and root canal with filling materials; and 4) restoration with one of several types of restoratives.¹⁷

In Table 7.5 we present estimates of the R.V.U. factors for the services involved in the treatment of caries.

The particular treatment program that we selected involved several considerations. First, we had to adopt a treatment service which is within the competence of both the dentist and the dental health nurse. We assumed that everything with an R factor reading of 1.25 or less is within the competence of the lesser trained dental health nurse. This assumption was made on the following grounds: first, the functions of the New Zealand dental health nurse normally have a reading of 1.25 or less by the estimation made by Clappison et al.; and second, the functions of the dental hygienists in Canada, who also have a two-year program, generally are assessed with a reading of 1.25 or less.¹⁸

With the operation of universal coverage, it seems plausible that the caries would not reach a point where the required treatment would be beyond the competence of a dental health nurse (an R reading of 1.25). Given no backlog of unattended dental care needs, we should therefore be able to devise a treatment

¹⁶"New Zealand Revisited", An Editorial, *Journal of the Canadian Dental Association*, Vol. XXI, No. 9, September 1965, p. 592.

¹⁷Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*, Appendix I, p. 3.

¹⁸J. T. Fulton, *Experiment in Dental Care*, World Health Organization Monograph Series, Geneva, 1951, p. 26; and R. A. Clappison et al., *op. cit.*, p. 764.

TABLE 7.5
Treatment Services for Caries

<i>Examination and diagnosis</i>			
"Dental Caries is readily observable either clinically or by radiographs and the presence of a lesion always necessitates treatment"			
<i>Clinical oral examination</i>	T	R	R.V.U.
1) General (for caries, periodontal disease, orthodontic status, etc.)			
—for new patient	2	1.25	1.25
—for previous patient	1	1.25	1.25
2) Specific (for any of the above in a specific area)	.5-.75	1.25	.6-.9
<i>Radiograph examination, including interpretation</i>			
Single periapical radiographs	—	—	.5
Additional (up to and including total of 7)	—	—	.25
Complete series, including bite-wing	—	—	4.0
Single bite-wing	—	—	.5
Posterior bite-wing	—	—	1.5
Occlusal radiograph			
1) mandibular	—	—	1.5
2) maxillary	—	—	1.5
Interpretation and written report	1	1.5	1.5
<i>Pulp tests</i>			
1) general (complete)	1	1.0	1.0
2) specific (local)	.125	1.0	1.25
<i>Consultation</i>			
with parent or patient	1-2	1.25	1.25-2.5
<i>Treatment presentation</i>			
(except special extensive treatment)	1-2	1.0	1.2
<i>Treatment of tooth caries</i>			
(N.B. no adjustment in "T" for deciduous teeth because of offsetting increase in the "R" and patient difficulty factors.)			
Amalgam: deciduous dentition			
1 surface (uncomplicated)	1	1	1.0
2 surface (uncomplicated)	1.25	1.25	1.6
3 surface (uncomplicated)	2	1.25	2.5
Amalgam: permanent dentition			
1 surface (uncomplicated)	1	1.0	1.0
2 surface (uncomplicated)	1.5	1.25	1.8
3 surface (uncomplicated)	2.5	1.25	3.1

TABLE 7.5 (Continued)
Treatment Services for Caries

Reinforced amalgam alloy restorations (pins)	2	1.75	3.5
Silicate cement and direct lesion restorations			(additional)
1) Class III and V	1.5	1.0	1.5
2) Class IV	2.0	1.25	2.5
3) Class IV reinforced restoration (pins)	2.5	1.25	3.0 total
<i>Operations arising from neglect of early caries treatment</i>			
Exposed pulp treatment	.75	1.25	.9
Removal of carious lesion and dressing	1.5	1.0	1.5
Endodontic treatment ¹	16.0	1.0-1.75	
Aprectomy (treatment of apical abscess) ¹	2		
Local anaesthesia	.25	1.75	.4
General anaesthesia for conservative dental treatment	DTR ²	1.75	
<i>Post-operative</i>			
Space maintaining-unilateral or bilateral acrylic removable appliances	3.	1.5	4.5+L

¹Canadian Dental Association, Brief to the Royal Commission on Health Services, March 1962; Appendix III, p. 1.

²Depending on time required.

SOURCE: R. A. Clappison, W. W. Pressey and R. C. Freeman, "Relative Value Method of Fee Determination", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 12, December 1965, p. 777.

procedure with no service having an R reading of over 1.25. The soundness of this assumption would depend on the extent of the development of more advanced cavities in spite of the existence of universal coverage.

We may further assume that despite universal coverage, the caries attack rate will remain constant, given that nothing of a preventive nature has been done. (It is possible that the presence of caries predisposes the mouth to further caries, but we could find no professional support for this.)

Tables 7.6 and 7.7 show a proposed treatment plan and the estimated required number of hours to service the entire population, assuming a check-up is made for each child every six months.

The time requirement for fillings ranged from 1.0 to 2.5 hours, but we decided to use the time requirement for the amalgam restoration of one surface for either the deciduous or permanent dentition. We chose this measure because, first, with regular care the cavities should not develop to a serious depth and, second, we wanted to be conservative in our estimation of time requirements.

TABLE 7.6
Proposed Treatment Plan and Time Required per Patient per Year¹

	F	T	I	Total Time per patient in ¼ hrs.	Time in hours
1. Clinical oral examination, specific	2	.5	—	1.0	.25
2. Treatment presentation	2	1	—	2.0	.50
3. Consultation with parent	2	1	—	2.0	.50
4. Treatment	—	1 ²	1.9 ²	1.9	.23
TOTAL				6.9	1.45

¹F = Frequency; T = Time; I = Incidence.

²See Table 7.4.

SOURCE: Table 7.4, Table 7.8.

It should be noted that we did not include such things as the general oral examination, radiographs, extractions, endodontic treatment, anaesthesia and space maintenance in our proposed plan. However, in the experience of the dental health nurses in New Zealand, scattered cases of more severe caries do occur. We should thus consider the appropriate services. Some of these additional services are within the competence of the dental health nurse, by our definition, and some are not. Our alternatives are either to enlarge the basic treatment service, or to have the personnel performing the basic services refer these more complicated cases to dentists either in public or private practice. The decision depends upon the estimated incidence of disease, the level of required competence of dental nurses, and any economies of scale that can or cannot be achieved.

We have made no allowance, either, for possible emergencies and post-treatment care. The latter would generally require but a few short minutes of instructing the patient on how to care for himself at home. The case of emergencies is more complicated. To answer this question, a study would have to be made

TABLE 7.7
Total Estimated Treatment Hours, 1971-1979

Year	Time per Patient (hours)	Population	Total
1971	1.5	2,550.191	3,825.287 — means
1972	1.5	2,572.977	3,859.466 3,825.000
1973	1.5	2,597.049	3,895.574 at least
1974	1.5	2,622.596	3,933.894
1975	1.5	2,645.399	3,968.099
1976	1.5	2,666.421	3,999.632
1977	1.5	2,690.022	4,035.033
1978	1.5	2,715.019	4,072.529
1979	1.5	2,744.711	4,117.067

SOURCE: Derived from Tables 7.4 and 7.6.

TABLE 7.8

Estimated Time Required per Patient per Year for Some Additional Services

	R.V.U.	F	T	I	Time in ¼ hrs.	Time in hours
1. Clinical oral examination general (caries, periodontal occlusion status)	1.25	2	2	—	4.00	1.00
2. Radiograph ¹	1.00	2	.5	—	1.00	.25
3. Interpretation of radiograph and written report	1.5	2	1.0	—	2.00	.50
4. Anaesthesia (local) ²	1.75	—	.25	.06	.02	.005
5. Removal of carious lesion and dressing ³	1.00	—	1.5	.04	.06	.02
6. Endodontic ⁴	1.00-1.75	—	1.6	.02	.32	.08
7. Space maintenance ⁵	1.5	—	3	.04	.12	.03

¹This estimate for time is for single bite-wing radiographs, and the estimate for the R factor was just a guess on our part.

²The assumption was made that only local anaesthesia services would be required for endodontic treatment and extractions, even though some types of fillings may require anaesthesia as well. The New Zealand dental health nurse can use local anaesthesia in her practice.

³The incidence figure was the figure of the mortality rate for permanent teeth by age fourteen in New Zealand in 1950.

⁴The estimates for incidence and time required are the CDA's.

⁵The incidence was arrived at by the assumption that there should be space maintainers for every extracted tooth.

SOURCE: R. A. Clappison, W. W. Pressey and R. C. Freeman, "Relative Value Method of Fee Determination", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 12, December 1965; J. T. Fulton, *Experiment in Dental Care*, World Health Organization Monograph Series, Geneva, 1951, p. 26; Canadian Dental Association, Brief to the Royal Commission on Health Services, March 1962, Appendix III, p. 3.

TABLE 7.9

Total Estimated Time per Year

Year	Time per Patient (hours)	Population	Total Time (hours)
1971	1.9	2,550,191	4,845,363
1972	1.9	2,572,977	4,888,656
1973	1.9	2,597,049	4,934,393
1974	1.9	2,622,596	4,982,932
1975	1.9	2,645,399	5,026,258
1976	1.9	2,666,421	5,066,120
1977	1.9	2,690,022	5,111,042
1978	1.9	2,715,019	5,158,536
1979	1.9	2,744,711	5,214,951

SOURCE: Tables 7.4 and 7.8.

of such factors as estimated incidence, the type of care required, the time interval possible between occurrence and treatment, and so on. In Tables 7.8 and 7.9 we give estimates of the time required for some of these additional services.

Prevention

Preventive dentistry concerns activities which prevent or, at least, minimize the incidence and seriousness of dental illness. In 1966, in panel discussion, the participants chose to define prevention “. . . to be those measures which help to maintain the dentition in its natural state without the addition of artificial substitutes for tooth structure”.¹⁹

As H. A. Grimsrud has noted,²⁰ the Canadian Dental Association recognizes four categories of preventive dentistry by place of responsibility: the individual, the family, the community, and the dental profession and its auxiliaries. The latter category refers to clinical services and research in the dental laboratories.

The importance of preventive dentistry cannot be overemphasized. W. Zacherl has said that “dental disease is essentially the disease of neglect”, and that it is almost entirely preventable.²¹ Similarly, J. Kreutzer has said “no one needs to lose a tooth through dental caries today nor should extensive restoration be necessary if known preventive measures are initiated early in life”; moreover, “. . . eighty per cent or more of the caries process can be prevented if a dentist applies up-to-date scientific knowledge of prevention and the techniques and obtains the patient's full co-operation in respect to oral hygiene, diet and regular re-call duties.”²²

These statements, if true, seem to yield two conclusions. First, the need for caries *treatment* (as opposed to care) can be cut by at least 80 per cent; and, second, the need for more complicated treatment measures which require more competent personnel can be largely eliminated. However, a great many of the known preventive measures are outside the dentist's direct control, and he can influence their adoption only through public education. The measures which he can influence directly are clinical (see Table 7.10) or research-oriented in nature. The number of hours required to provide preventive services can be determined in a manner similar to that used for treatment services. This is done and the results presented in Table 7.11.

While we realize that other preventive measures also should be investigated, we have concentrated on the topical application of fluoride solutions.

¹⁹P.S. Christie, “The Evolving Role of Dentistry in a Changing Society”, *Journal of the Canadian Dental Association*, Vol. XXXII, No. 5, May 1966, p. 273.

²⁰H. A. Grimsrud, “What Can the Public Health Dentist Do for Preventive Dentistry,” *Journal of the Canadian Dental Association*, Vol. XXXII, No. 12, December 1966, p. 702.

²¹W. Zacherl, “Trends in Dental Public Health”, *Canadian Journal of Public Health*, Vol. LVI, No. 12, December 1965, p. 509.

²²J. Kreutzer, *op. cit.*, pp. 694-699.

TABLE 7.10
Preventive Services

	T	R	R.V.U.
Prophylaxis			
1) scaling (applicable only to a regular maintenance service)			
2) Polishing			
deciduous dentition	1	1.0	1.0
mixed dentition	1-2	1.0	1.0-2.0
permanent dentition	2-3	1.0	2.0-3.0
Topical application of solution for caries control	1	1.0	1.0
Oral hygiene instruction (oral physiotherapy), brushing, massaging and embrasure cleansing	1	1.0	1.0
Diet analysis and recommendations	1	1.25	1.25
Dental caries susceptibility test	1	1.0	1.0 + L
Finishing restorations (including refinement of marginal ridges and occlusal surfaces)	1	1.0	1.0
Space maintaining unilateral or bilateral acrylic removable appliances	3	1.5	4.5 + L

SOURCE: R. A. Clappison, W. W. Pressey and R. C. Freeman, "Relative Value Method of Fee Determination", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 12, December 1965, pp. 763-778.

TABLE 7.11
Cost of Preventive Services per Child in Terms of Chair-side Hours

	F	T	TOTAL
Prophylaxis			
1) scaling and polishing			
deciduous dentition	2	1	2
mixed dentition	2	1-2	2-4
permanent dentition	2	2-3	4-6
2) Topical application of solutions (for caries control)	2	1	2
Dental susceptibility tests final?)	2	1	2
Recall and file maintenance ¹	2	.5	1

¹Our own estimate.

SOURCE: R. A. Clappison, W. W. Pressey and R. C. Freeman, "Relative Value Method of Fee Determination", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 12, December 1965.

Before fluoride solution can be applied, "... each quadrant of the mouth must be thoroughly cleaned, isolated and dried, and the teeth must be kept wet with the solution for several minutes with the mouth held open".²³ Grainger et al. estimate a minimum of twenty to thirty minutes for each application.²⁴ Studies have shown that if sodium fluoride is applied several times (Knutson et al. have shown that the optimal number of applications is four over a period of a few weeks), the incidence of new caries will be reduced from 20 to 40 per cent for the period one to three years after the applications ceased.

These studies also indicated, however, that these applications seem merely to postpone rather than stop the incidence.²⁵ Grainger et al. tell of a study made by Syrrist and Karlsen in which over the two years when the applications were given the incidence fell 47 per cent, but within five years after the end of treatment the prevalence was only 15 per cent below the level of the untreated teeth. This would imply that continuous application is necessary. Stannous fluoride has been shown to reduce caries from 35 to 60 per cent over periods ranging from one to three years.²⁶

TABLE 7.12

Return per Child in Using Fluoride Solutions Topically Applied Every Six Months in Terms of Treatment Hours Saved¹

	I'	I''	I' - I''	T'	T''
Sodium Fluoride (2% solution)	1.9	1.7	.2	.75	.15
Stannous Fluoride	1.9	1.6	.3	.75	.23

¹I' = untreated incidence (see Table 7.4). This figure is biased, for we have no idea how many of the children in the sample in the Lewis et al. study had received topical applications. We feel, however, that they would not be significant in number.

I'' = new reduced incidence with topical applications—i.e., 10% = 15% reduction for sodium fluoride and stannous fluoride respectively.

T' = amount of time required for restorative treatment. We allowed the time saved from operations 2 and 4 only in Table 7.6.

T'' = estimated amount of time saved in treatment hours.

For the purpose of estimating returns, we assume that the incidence is reduced 10 per cent per year for sodium fluoride and 15 per cent for stannous fluoride. This is based on the 20 to 40 per cent reduction over a period of one to three years for sodium fluoride, and 35 to 60 per cent reduction for stannous fluoride. From these assumptions we derived the data contained in Table 7.12.

As for saving time in the dental personnel work day, it seems possible that the application of topical solution to the children's teeth is not advisable. Dental

²³R. M. Grainger, G. Nikeforuk, and K. J. Paynter, *Dental Health and Fluorides*, A Submission to the Ontario Fluoridation Investigating Committee, Toronto, November 1959, p. 45.

²⁴*Ibid.*

²⁵*Ibid.*, p. 42.

²⁶*Ibid.*

care personnel would allocate anywhere from an hour and a half per patient per year (see Table 7.11. It is assumed they perform the prophylaxis as well). The only time that one can expect to save in treatment hours is one quarter of an hour per patient per year (see Table 7.12).

One argument for the use of topical solutions is that it may be much preferable to prevent the occurrence of caries than to treat them. This is a value judgement which can be made only by those responsible for decision-making in a universal care plan. Another possible argument on the economic level that we have not explored is that although topical solution application is more costly in terms of personnel, it may be less expensive in terms of capital equipment and materials.

Public Education

Public education is concerned with teaching and convincing the public of the value of preventive steps that can be taken in the home (by either the child or the parent) and in the community as a whole. The main areas of public education are diet or nutrition, oral hygiene, the use of fluorides, and regular check-ups including prophylaxis. Environments in which public education can be dispensed include the dentist's office, the school classroom, and the home, by both direct and indirect mediums.

Estimates of the return in terms of reduced incidence and thus a reduction in the number of treatment hours can be estimated per person for the various types of these non-clinical measures; but the cost in terms of dental personnel hours is a little more difficult to judge. First, there are various ways of reaching the public with this information and various types of personnel who are capable of doing the job. Second, evidence has been revealed that it is not enough to teach people the proper methods, but they must be convinced also of the importance of practising good dental health. W. G. MacIntosh and O. Hall²⁷ have emphasized the apathy of the public towards the importance of oral health. In a study of 361 residents in the Trail, British Columbia area, Goodacre et al. showed that the "... respondents' awareness of the value of these dental health measures was not translated into routine practice".²⁸

Fluoridation of the water supply is a good example of a measure that could be adopted by the community as a whole. It has been advocated by dentists, including the CDA, that fluoride be introduced into the drinking water at a ratio of one part per million parts of water. They argue that it is necessary for children in the years that their teeth are developing (three to twelve)²⁹ to receive a certain

²⁷O. Hall, *Utilization of Dentists*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1964, p. 43; and W. G. MacIntosh, *Globe and Mail*, Toronto, June 23, 1967, p. 12.

²⁸R. H. Goodacre, McConbie, L. W. Hole, and M. Williamson, "Survey of Community Knowledge, Attitudes and Habits in Regard to Four Dental Health Practices as They Apply to Children", *Journal of the Canadian Dental Association*, Vol. XXII, No. 7, July 1966, p. 417.

²⁹Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*, Appendix I, p. 2; and W. H. Hill, *op. cit.*

TABLE 7.13

Sample Size, DMF Average per Child, Intercity Differences, and Return per Child in Using Fluoridated Drinking Water in Terms of Treatment Hours Saved

- 1) Sample size: Sarnia — 482; Brantford — 356; Stratford — 227.
The sample was of children between the ages of sixteen and seventeen who had lived continually in one of the three cities. This meant that they were never out of the city for a period of more than six weeks.
- 2)

DMF Average per Child					
Sarnia		Brantford		Stratford	
DMF	S.E.	DMF	S.E.	DMF	S.E.
10.44	+0.215	4.74	+0.176	4.19	+0.212

Intercity Differences			
Sarnia and Brantford		Brantford and Stratford	
— 5.70	SS	— .55	NS

(SS = statistically significant at 3 standard error level)
(NS = not statistically significant — P = 75%)

3) Return per Child in Using Fluoridated Drinking Water in Terms of Treatment Hours Saved¹

I'	I''	I' — I''	T'	T''
1.9	.9	1.0	.75	.75

¹I' = incidence of caries as suggested by CDA.

I'' = incidence if water fluoridated.

T' = amount of time saved per caries, allowing for operations 2 and 4 only in Table 7.6.

T'' = estimated amount of time saved in treatment hours.

SOURCE: H. K. Brown, and M. Poplove, "The Brantford-Sarnia-Stratford Fluoridation Caries Study, 1963", *Canadian Journal of Public Health*, Vol. LVI, No. 8, August 1965, p. 319.

amount of fluoride in their diet. Fluoride has a strong affinity for calcium and tends to harden it. This gives the teeth greater resistance to the bacterial acidity of the mouth. In the post-eruptive stages teeth absorb fluoride through their surfaces, until at adult life teeth are on the average less susceptible to caries.³⁰

The CDA Brief to the Hall Commission stated that fluoridated water supplies should reduce the "... average rate of *new* dental caries . . . by 60 per cent".³¹ This appears to us relatively high, if we are to accept Dr. Kreutzer's figure of 80 per cent or more for all preventive measures.³² Of course, the "or more" could be the loop-hole.

The Brantford-Sarnia-Stratford Fluoridation Caries Study as reported in several

³⁰Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*, Appendix I, p. 2.

³¹*Ibid.*, p. 52.

³²J. Kreutzer, *op. cit.*, p. 695.

articles by H. K. Brown and M. Poplove³³ is a rather interesting experiment which took place over a period of eighteen years (1945-1963). In this experiment they investigated the teeth of children who had lived solely in one of the three cities since birth. Stratford had naturally fluoridated water with a ratio of 1.6 ppm; Brantford had fluoride chemically introduced into the water in a ratio up to 1.2 ppm; and Sarnia had no fluoride in its water. The major conclusions were that the presence of fluoride in the water, due to either natural causes or chemical introduction, substantially reduced dental caries with no observed side-effects. This beneficial effect extended until at least the eighteenth year of life. The detailed results are shown in Table 7.13.

As a rough measure we will use this reduction in the incidence of caries to calculate to what extent caries treatment can be reduced in terms of man-hours. We should be careful of the results, however, for at least three reasons. First, this rate of reduction represents children who have drunk fluoridated water all their lives. Second, we do not know the relative level of other types of dental care in these three cities. Finally, the incidence of new caries that the CDA gives us applies to both fluoridated and non-fluoridated water systems throughout Canada; thus the reduction in incidence estimated using the percentage derived from Brown's study is not entirely accurate. Ideally, we should subtract the average incidence rate for all fluoridated water communities from the average of all non-fluoridated water communities to obtain the effect of fluoridated drinking water in reducing dental caries. The data in Table 7.13 and 7.14 incorporate data from H. K. Brown's study.

TABLE 7.14

Total Time Saved in Ontario for Years 1971-1979 if Drinking Water is Fluoridated¹

Year	Time per Child	Population	Total in Hours
1971	.75	2,550.191	1,912.644
1972	.75	2,572.977	1,929.733
1973	.75	2,597.049	1,947.787
1974	.75	2,622.596	1,966.948
1975	.75	2,645.399	1,984.049
1976	.75	2,666.421	1,999.816
1977	.75	2,690.022	2,017.517
1978	.75	2,715.019	2,036.264
1979	.75	2,744.711	2,058.533

¹Compare to Table 7.9.

³³H. K. Brown, "The Brantford-Sarnia-Stratford Fluoridation Caries Study", *Canadian Journal of Public Health*, Vol. LIII, No. 10, October 1962, p. 401; H. K. Brown and M. Poplove, "The Brantford-Sarnia-Stratford Fluoridation Caries Study, 1963", *Canadian Journal of Public Health*, Vol. LVI, No. 8, August 1965, p. 319.

The cost in dental personnel hours of educating the public about the need for fluoridated water is hard to estimate. However, it seems unlikely that in the long run the costs would be greater than the returns. Once the water is fluoridated there is an expected saving of .75 hours per child for every year from now until eternity. This cuts the previous estimated time by one half (see Table 7.6). Viewed in this light, the dental care personnel time spent now is quite probably a worthwhile investment. Besides, we suspect most of the educating chore can be done by non-dental care personnel; to the extent that this is true, the cost in terms of dental care personnel time approaches zero. There is, of course, the actual cost of fluoridating the water; but this will not involve the time of dental care personnel and, in any event, apparently the cost is not high.

Certain indirect preventive measures, which are the responsibility of either the parent or the child, must be performed in the home. These measures generally fall into one of two categories: oral hygiene, and proper diet. "The object of oral hygiene procedures is to assist in the maintenance of oral health by influencing either the oral tissues or their bacterial flora by mechanical cleansing or specific therapeutic effect of chemicals."³⁴ Some of the measures that can be undertaken are regular brushing immediately after every meal, use of a good dentifrice, good eating habits, and possibly gum chewing. The direct cost of these measures in dental care personnel hours is clearly negligible, but some cost is probably incurred through efforts to convince the community of the value of such precautions. The expected return is very hard to measure; and there is, to our knowledge, very little information on the effectiveness of preventive measures.

Ironically enough, there is no simple relationship between mouth cleanliness and dental caries; for it is the quality and not the quantity of the debris in the mouth which seems to be relevant.³⁵

There is "... evidence of a relationship between bacterial counts of surface deposits on the teeth and the presence of dental caries".³⁶ There is also evidence that regular brushing immediately after eating significantly reduces cavities,³⁷ but "it is not possible on the basis of published data to state the extent of such protection".³⁸ For example, in a two-year study conducted in 1950, 946 young adults were divided into two groups: 523 were instructed to brush with a neutral paste (or otherwise rinse with water) within ten minutes of ingestion of food or sweets; the control group was instructed to proceed as normal (this generally meant

³⁴J. B. MacDonald and G. Nikeforuk, "An Evaluation of Dentifrices in the Prevention of Dental Caries and Gingivitis", *Journal of the Canadian Dental Association*, Vol. XXI, October 1955, p. 577.

³⁵United States, Department of Health, Education and Welfare, *Oral Hygiene in Adults, U.S.* —1960, 1962, U.S. Government Printing Office, Washington, D.C., June 1966, p. 1; J. B. MacDonald and G. Nikeforuk, *op. cit.*, p. 557.

³⁶J. B. MacDonald and G. Nikeforuk, *op. cit.*

³⁷*Ibid.*

³⁸*Ibid.*

TABLE 7.15
Return per Child from Regular Brushing after Every Meal
in Terms of Treatment Hours Saved

	I'	I''	I' - I''	T'	T''
Fosdick's data	1.9	1.1	.8	.75	.6
Kerr and Kesel's data	1.9	1.7	.2	.75	.15

I' = untreated incidence.

I'' = new reduced incidence.

T' = amount of time saved per caries, allowing for operations 2 and 4 only in Table 7.6.

T'' = estimated amount of time saved in treatment hours.

TABLE 7.16
Total Time Saved if Whole Population Brushed Teeth Regularly
after Every Meal

Year	Time Saved per Child (hours)		Population	Total Time Saved (hours)	
	(a) Fosdick	(b) Kerr and Kesel		(a)	(b)
1971	.8	.2	2,550.191	2,040	510.038
1972			2,572.977	2,058.382	514.600
1973			2,597.049	2,077.640	519.410
1974			2,622.596	2,098.077	524.519
1975			2,645.399	2,116.319	529.080
1976			2,666.421	2,133.137	533.284
1977			2,690.022	2,152.018	538.004
1978			2,715.019	2,172.015	543.004
1979			2,744.711	2,195.767	548.942

brushing on arising or retiring). The results indicated a decrease of 41 per cent and 60 per cent respectively in the dental caries rate by clinical and radiographic examinations.³⁹

Kerr and Kesel, who conducted a study⁴⁰ in 1951 involving 1,716 children aged ten and eleven, had different results. Their study took place during school hours; the children brushed their teeth under supervision at 9 a.m. and 1 p.m. (they were urged to brush after supper also). Over a period of — months, a caries reduction of only 9.3 per cent was reported. This small decrease might be explained by the length of time between eating and brushing.

From Kerr and Kesel, and from Fosdick,⁴¹ we derive the data presented in Tables 7.15 and 7.16 on the number of treatment hours saved as a result of regular brushing.

³⁹*Ibid.*

⁴⁰D. Kerr and R. G. Kesel, "Two-Year Caries Control Study Utilizing Oral Hygiene and Ammoniated Dentifrice", *Journal of the American Dental Association*, Vol. XLII, February 1951, pp. 180-188.

⁴¹L. F. Fosdick, "The Reduction of the Incidence of Dental Caries", *Journal of the American Dental Association*, Vol. XL, February 1950, p. 133.

"Dentifrices are generally a mixture of an abrasive, a detergent, a flavouring agent and substance necessary to facilitate their preparation and use."⁴² Therapeutic dentifrices contain as well some chemical which is intended to reduce the incidence of dental caries or gingivitis. In their article MacDonald and Nikeforuk review some of the studies that have been conducted to establish the effectiveness of the various therapeutic agents. Because of the inconclusiveness of the statistical studies, we will not assume any return on the use of dentifrices over and above what can be gained from regular brushing. However, intuitively, one would suspect that certain types of dentifrices would be more beneficial than others, and for this reason more research seems to be called for in this area.

Apart from proper nutrition (diet), good eating habits will aid in oral hygiene. Some of the suggested habits are the following:

- 1) Eat three regular meals a day with no in-between snacks.
- 2) Avoid eating sweets especially in a solid sticky form.
- 3) Eat sweets, if at all, at the end of a regular meal.
- 4) Finish every meal with some type of cleansing food such as a raw carrot, an apple or a pear.
- 5) Rinse the mouth vigorously with water after every meal, especially if it is not possible to brush.

We have not been able to find any statistics to support claims that following these rules reduces the incidence of caries.

Similarly, there is no conclusive proof as to the usefulness of chewing gum. After summing up the "Current Status of Chewing Gum in Preventive Dentistry",⁴³ A. S. Richardson and C. R. Castaldi conclude that "... further large-scale laboratory and clinical studies are needed before the dental profession can recommend or reject chewing gum as an effective method for improving oral health".⁴⁴

The intake of proper foods in the proper quantities is essential to the general health of a growing body as well as to the health of the teeth. It is absolutely necessary that people be educated and convinced of the need of a nutritious diet.

We have now discussed some of the ways in which people other than dental care personnel can use preventive measures against dental caries. The cost of educating people, in terms of dental care personnel hours, has yet to be determined. To arrive at an estimate, one would have to find some indication of the degree of public response to public education. This matter would seem to require a large-scale study of its own.

⁴²*Ibid.*

⁴³A. S. Richardson and C. R. Castaldi, "Current Status of Chewing Gum in Preventive Dentistry", *Journal of the Canadian Dental Association*, Vol. XXXI, No. 11, November 1965, pp. 713-720.

⁴⁴*Ibid.*, p. 720.

Proposed Treatment Program

After consideration of several possible services available, it would appear that the best plan of care would be the entire treatment program outlined in Table 7.6, plus a strong emphasis on public education and perhaps prophylaxis treatment at every sitting. In addition, some provision would have to be made for the treatment of teeth with severely neglected caries. As stated earlier, we ignore this for the moment on the grounds that these services should be negligible for children with regular care.

The plan then would include 1.5 hours per child per year for treatment, plus 1.5 hours for prophylaxis and education. Clappison et al. estimate the time for prophylaxis to be fifteen to thirty minutes per operation for mixed dentition; we are assuming that this operation will be performed twice yearly. Also, Clappison et al. estimate that it should take fifteen minutes to perform a diet analysis and make recommendations.⁴⁵ Finally, we are allocating arbitrarily one half hour per child for other aspects of education.

Although the total hours per child for preventive and educative dentistry add up to 1.75 approximately, we are allocating only 1.5 to it. This is done on the grounds that there could probably be some doubling up. For instance, some direct chair-side education could take place during the prophylaxis and diet analysis. Also, this divides the total three hours of care per child per year evenly between treatment on one hand, and prevention and education on the other, with each getting 1.5 hours.

One of the biggest drawbacks to this time estimate is our neglect of the organizational aspect of any given practice. For instance, although it may take three hours of a child's time for the care required, it is possible that a dentist may be more efficient using two or three chairs and treating these patients simultaneously.

TABLE 7.17
Proposed Care Plan: Time Requirements per Child

Type of Care	TIME PER CHILD
Treatment ¹	1.50
Prophylaxis ²	1.00
Diet analysis and recommendation	.25
Education	.50
Total	3.25

¹See Table 7.15.

²See Table 7.19.

⁴⁵R. A. Clappison et al., *op. cit.*

The same comments are probably valid also for the efficiency of care provided by the dental health nurse. The time requirements are summarized in Tables 7.17 and 7.18.

TABLE 7.18**Proposed Dental Care Plan: Total Required Time for All Children in Ontario**

Year	Time per Child	Population Estimate	Total
1970	3.0	2,528.300	7,584.900
1971	3.0	2,550.191	7,650.573
1972	3.0	2,572.977	7,718.934
1973	3.0	2,597.049	7,791.147
1974	3.0	2,622.596	7,867.788
1975	3.0	2,645.399	7,936.197
1976	3.0	2,666.421	7,999.263
1977	3.0	2,690.022	8,070.066
1978	3.0	2,715.019	8,145.057
1979	3.0	2,744.711	8,234.133

Proposed Personnel Requirements

Having estimated the total number of care hours required to operate our proposed plan, we now estimate the total number of dental care personnel required. It is obvious that the responsibilities involved in the proposed plan could be divided among several types of personnel, but in this paper we are concerned only with the alternatives of dentists alone or dental health nurses alone. Once we know the required number of personnel, we can estimate the cost of each of the two alternatives.

The Spens Report in the United Kingdom suggested that thirty-three hours a week for forty-six weeks a year, or 1,500 chair-side hours, was full but not excessive employment, and that anything in excess of this tends to impair efficiency. (The CDA says that the average dentist in Canada works forty-one hours a week, thirty-four of these at the chair, forty-six to forty-seven weeks a year.)⁴⁶ Using the estimate of the Spens Report, we have calculated the required number of dentists; this information is presented in Table 7.19.

This estimated number of required dentists must be modified somewhat by considering the concentration of population in which the dentist is located and the efficiency with which his office is organized. For example, productivity can be related to the ratio of assistants to patients and/or the number of patient visits.

⁴⁶Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*, Appendix III, pp. 7-8.

TABLE 7.19
Required Number of Dentists

Year	Time per Dentist (hours)	Total Estimated Time ¹ (hours)	Total No. of Dentists	Increase Required per Year
1970	1,500	7,584,900	5,056	+ 44
1971	1,500	7,650,573	5,100	+ 46
1972	1,500	7,718,934	5,146	+ 48
1973	1,500	7,791,147	5,194	+ 51
1974	1,500	7,867,788	5,245	+ 56
1975	1,500	7,936,197	5,291	+ 42
1976	1,500	7,999,263	5,333	+ 47
1977	1,500	8,070,066	5,380	+ 47
1978	1,500	8,145,057	5,430	+ 50
1979	1,500	8,234,133	5,489	+ 59

¹See Table 7.18.

TABLE 7.20
Relationship of Patient Turnover and Number of Assistants Employed

No. of Employees		Mean No. of Patients	Mean No. of Patient Visits
Full-time	Part-time		
0	0	742	2,272
0	1	710	2,376
0	2	1,095	2,742
1	0	1,166	3,014
1	1	1,242	3,182
1	2	1,404	3,237
2	0	1,530	3,174
2	1	1,607	4,005
3	0	1,931	3,929

SOURCE: University of Michigan, W. K. Kellogg Foundation Institute, Graduate and Postgraduate Study, Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel, Edwards Brothers, Ann Arbor, Michigan, January 1962.

This was done in the Michigan Study,⁴⁷ the results of which are presented in Table 7.20.

The total number of dental health nurses is assumed to be the same as the total number of required dentists, on the basis that the proposed care program is within the competence of the dental health nurse.

⁴⁷University of Michigan, W. K. Kellogg Foundation Institute, Graduate and Postgraduate Study, Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel, Edwards Brothers, Ann Arbor, Michigan, January 1962.

For several reasons this assumption, that we require the same number of personnel regardless of whether we choose all dentists or all nurses, may not be accurate. First, if the health nurse is to be patterned after the New Zealand nurse, then she will be entirely on her own with no auxiliary help;⁴⁸ this would not seem to be an irremovable constraint. Second, her productivity may not be as high as that of a dentist. A Royal Canadian Dental Corps study showed that the clinical supervisor performed nearly four hours of dental officer equivalent hours per duty day (6.5 hours).⁴⁹ This may be explained by the fact that they did not work independently of the dentist, or by the fact that they did some of the dental hygienist's duties as well. Nevertheless, it is possible that some of the difference is due to a lower level of skill. Our own feeling is that, if there is less productivity on the part of the dental health nurse, it is solely because she works alone. The nature of her work requires a high level of digital technical skill, but relatively little professional knowledge is required. Therefore, from sheer repetitive practice the nurse should become as productive as the dentist, if not more skilled in her limited area. The same problems which modify the estimated requirements for dentists affect the estimations for dental nurses. These problems concern patient flow, rural areas and work organization.

Annual Cost of Proposed Program

Once we know the number of personnel required, we are able to estimate the annual cost of the program. The average dentist in Ontario in 1964 earned about

TABLE 7.21
Annual Cost of Carrying out the Proposed Program: Dentists

Year	Estimated No. of Dentists	Taxable Income 1964 ¹	Total
1971	5,100	16,231	82,778,100
1972	5,146		83,524,726
1973	5,194		84,303,814
1974	5,245		85,131,595
1975	5,291		85,878,221
1976	5,333		86,559,923
1977	5,380		87,322,780
1978	5,430		88,134,330
1979	5,489		89,091,959

¹This net income figure makes no allowance for the fact that income will probably rise in the future.

⁴⁸J. T. Fulton, *op. cit.*, p. 26.

⁴⁹K. M. Baird, G. B. Shellington, and D. H. Protheroe, "Pilot Study on the Advanced Training and Employment of Auxiliary Dental Personnel in the Royal Canadian Dental Corps: Preliminary Report", *Journal of the Canadian Dental Association*, Vol. XXVIII, No. 10, October 1962, p. 633.

\$16,231 taxable income.⁵⁰ Taxable income is the best figure to use, for it is the closest measure of what the man himself earned, rather than his practice. The average refers to an unweighted mean. From this and previous information, we derive the total cost to society each year associated with paying the required number of dentists. These estimates are presented in Table 7.21.

The annual cost of the dental health nurse in rendering the services required is a little more difficult to estimate, because this type of personnel does not now practise in Ontario or Canada and thus there are no income data available. There are at least three alternative ways of estimating their income. First, we could take the ratio of the income of the dental health nurses to that of dentists in New Zealand and apply this ratio to the income of dentists in Canada. Second, we could assume that the nurse should be paid the same as the dental hygienist in Canada. Finally, we could assume that she be paid the same as a public health nurse. We have followed the first alternative.

Gruebbell, in his study of the dental public health services in New Zealand, states that there have been no studies on the income of dentists in New Zealand, but that officials in the New Zealand Dental Association estimate the average gross income to be about £3,000 and the average net income to be about £1,500.⁵¹ The mean income of the dental health nurse is then estimated as £347 (or, say, £350) and the median income is £374.6 (or £375). Therefore, the ratio of incomes is either 350/1,500 (.23) or 375/1,000 (.25); this is approximately a 1:4 ratio. Accordingly, the total annual cost of carrying out the proposed program using dental health nurses rather than dentists would be approximately one-quarter of the amounts presented in Table 7.21.

We could stop our study at this stage. The equilibrium incomes paid to the dental health nurse and the dentist presumably include adjustments for the costs imposed on the individual personnel. Further, as long as the total costs of education of the two types of personnel are not different from the 1:4 ratio, then the 1:4 ratio can be taken as a rough indication of the relative costs of mounting the program of universal care for dental caries in children using either dentists or dental health nurses. We would, however, like to consider further the relative costs of education.

Cost of Education

The Dentist

The data in Table 7.19 indicate the number of dentists that will be required to care for children's teeth in Ontario. To supply these additional dentists, we must

⁵⁰Canada, Department of National Revenue, Taxation Division, *Taxation Statistics, Part I*, 1966 Edition, Queen's Printer, Ottawa, 1966, p. 73.

⁵¹A. O. Gruebbell, *A Study of Dental Public Health Services in New Zealand*, American Dental Association, Chicago, 1950, p. 8.

either educate more dentists or import them; the former alternative probably costs more than the latter, and this is the one we will examine.

The first problem is to determine the expected attrition rate, including the net emigration rate. The number of new dentists that begin to practise in Ontario each year must compensate for the two rates, and also provide the required number to supply the need for increases in the population. The second problem is to determine how big the dental schools must be to produce the required number of new dentists. To do this, we must know how many of the graduates in any one year will practise in Ontario, and we must know the failure rate of the students as they proceed through the four-year course. Third, we must estimate the cost to the institution of educating the required number of students. This involves both fixed and variable costs. Fourth, we must deal with the cost to the student of his education and the related problem of recruitment.

Attrition. For simplicity, we ignore the problem mentioned earlier, that the productivity of the dentists can vary from dentist to dentist, and we assume that one dentist is required to replace each dentist that leaves the profession. McFarlane states that the attrition rate, which includes such variables as emigration, death, retirements and change of occupation, was on the average 2.45 per cent annually (median) between the years 1945 and 1961 inclusive.⁵² We accept this rate as a rough indicator of the attrition rate for the projected years under study. There are biases, of course. If a dentist practises solely on the carious teeth of children, the chances are higher that he will become more easily disenchanted with his job and that the attrition rate will rise. Also, if we institute a crash program to produce the required number for 1971, the age distribution of the dentists will shift downward; this should reduce the number of deaths and retirements for the short run at least. (See Table 7.22.)

Failure rate. At present it takes a minimum of five years of post-secondary schooling to become a dentist; one year of predentistry and four within the dental school. Even if the size of the student enrolment in the dentistry school only is used, no failures or drop-outs assumed, facilities to handle a school population four times the size of the required number of graduates are required. However, there are failures and drop-outs.

Dr. Paynter has stated that in the 1961-1962 session, Canadian dental schools lost on the average 11.1 per cent of their first year students.⁵³ "This wastage of first year students does not seem to change greatly in the dental schools over

⁵²B. A. McFarlane, *Dental Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1964, p. 28.

⁵³K. J. Paynter, *Dental Education in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, pp. 34-35.

TABLE 7.22
Number of Graduates Required Each Year, Allowing for Attrition

Year	Estimated No. of Dentists ¹	Estimated Attrition Rate = 2.45 %	Required Increase	Total Graduates Required
1970	5,056	.124	—	—
1971	5,100	.125	44	168
1972	5,146	.125	46	171
1973	5,194	.126	48	174
1974	5,245	.127	51	178
1975	5,291	.129	56	185
1976	5,333	.130	42	172
1977	5,380	.131	47	178
1978	5,430	.132	50	182
1979	5,489	.133	59	192
TOTAL				1,600

¹See Table 7.19.

years"⁵⁴ During the same session about 7 per cent in the second year failed to advance, about 5 per cent in the third, and only one or two per cent failed in the fourth year.⁵⁵ We shall assume the failure rate for fourth year to be insignificant.

Graduates practising in Ontario. In a *Survey of Recent Graduates*, 1962, by the CDA, dental graduates of the previous ten years were asked to state the location of their practice: 80.5 per cent of them stated they practised in the province of their residence previous to their entry into dentistry school, and 4.9 per cent of them stated that they practised in the province where they went to school.⁵⁶ In the 1961-1962 academic year, of a total of 410 dental students at the University of Toronto, 395 (96 per cent) were from Ontario.⁵⁷ This means that 80.5 per cent of the 395 students were available to practise in Ontario. Besides this, of the 4 per cent of the enrolment from outside the province, 4.9 per cent intended to practise in Ontario. In deriving our estimates (see Table 7.23), we shall not consider this small proportion of out-of-province graduates who practised in Ontario.

Cost to the institution. Paynter believes that \$3,000 a year per student is a realistic figure to use, although in the 1961-1962 session the rate per student was

⁵⁴*Ibid.*

⁵⁵*Ibid.*

⁵⁶Canadian Dental Association, *Survey of Recent Graduates*, Canadian Dental Association, Toronto, 1962.

⁵⁷K. J. Paynter, *op. cit.*, p. 33.

TABLE 7.23
Total Required Enrolment in Dental Schools in Ontario, 1971-1979

Year	Req'd No. of New grads needed in Ontario ¹	Req'd No. of grads in Course Yr. 4. 122.8 % of previous column ²	Course Yr. 3 105 % of 4th Yr.	Course Yr. 2 107 % of 3rd. Yr.	Course Yr. 1 111.1 % of 2nd Yr.	Total
1968					257	257
1969				231	262	493
1970			216	236	268	720
1971	168	206	221	241	273	941
1972	171	210	225	246	283	964
1973	174	214	230	255	264	963
1974	178	219	238	238	273	968
1975	185	227	222	246	278	973
1976	172	211	230	250	294	985
1977	178	219	234	265	—	718
1978	182	223	248	—	—	471
1979	192	236	—	—	—	236

¹From Table 7.22.

²Class must enlarge by 22.8 per cent (80.5 per cent of 96 per cent is 77.2 per cent).

\$2,400, exclusive of overhead.⁵⁸ Of this \$2,400, 80 per cent was spent on salaries and the remaining 20 per cent on supplies, stationery, and so on.⁵⁹ Dalhousie University is the only university that figured overhead costs into the money allocated to its dentistry school, and this practically doubled the budget.⁶⁰ This would mean almost \$4,800 per student; or, accepting Paynter's estimate of \$3,000 exclusive of overhead, it would be \$6,000 per student. In discussing overhead costs, Paynter referred to such items as heat, light and building maintenance.⁶¹ Overhead costs do not include capital costs, which must be allowed for as well.

TABLE 7.24
Total Enrolment in B.C. School

Course Year	No. of Students
Fourth	40
Third (105% of 4th)	42.1
Second (107% of 3rd)	45.3
First (111.1% of 2nd)	51.4
TOTAL 178.8 or 180	

⁵⁸*Ibid.*, p. 86.

⁵⁹*Ibid.*

⁶⁰*Ibid.*, p. 85.

⁶¹*Ibid.*

To get some idea of the capital cost per student, we use the data in Paynter's study concerning the estimated capital costs of a new school of dentistry being built in British Columbia.⁶² British Columbia is spending \$3,200,000 in capital costs to graduate forty students a year. Using the failure rates set out in the last section, this means there will be a total student annual enrolment of approximately 180 students. (See Table 7.24.)

If we assume a straight-line depreciation for twenty years, which is a very rough method, the depreciation of the capital comes to \$900 per student per year. Even given its accuracy to this point, this allocation of depreciation still has an upward bias. Although we do not know what the facilities are to be at the University of British Columbia, it is safe to assume that there are facilities for other programs besides the instructional program for the dentists. These other courses are as essential to the education of dentists, especially in the long run, as the instructional program, but allowance for depreciation should be made for them as well. We are referring to such programs as graduate education; refresher courses; education for dental hygienists, technicians, assistants, public health students; research; advisory services to granting agencies; and other services to teaching and/or general hospitals, and to the community in general.⁶³

Some of these costs of education are borne by the student by way of tuition fees (which Paynter says were \$475 a year on the average in Canada in 1961-1962) and by the teaching clinic (which in 1961-1962 recovered on the average approximately 10 per cent of the total cost).⁶⁴ The costs to the institutions are summarized by the data in Tables 7.25 and 7.26.

These figures do not represent the total cost to the university, for there is still the pre-dentistry school year. We should note also that the figures in Table 7.26

TABLE 7.25

Total Cost to the Institution for Dental Education per Student per Year

Operating costs per student	\$6,000	
Capital costs per student	900	
Subtotal		\$6,900
Minus		
Tuition fees per student	\$ 475	
Teaching clinic income (10%)	690	
Subtotal		\$1,165
TOTAL		\$5,735

⁶²*Ibid.*, pp. 89-91.

⁶³American Dental Association, *Cost Study of Dental Education*, American Dental Association, Chicago, 1965, pp. 3-4.

⁶⁴K. J. Paynter, *op. cit.*, p. 88.

TABLE 7.26
Total Cost Borne by Institution to Educate Dentists per Year
for Service Between 1971 and 1979¹

Year	Number of Students Required ²	Cost Per Student ³	TOTAL
1968	257	\$5,735	\$ 1,473,895
1969	493		2,827,355
1970	720		4,129,200
1971	941		5,396,635
1972	964		5,528,540
1973	963		5,522,805
1974	968		5,551,480
1975	973		5,580,155
1976	965		5,648,975
1977	—		
1978	—		
1979	—		
Total	7,264	\$5,735	\$41,659,040

¹Average cost per year for the nine-year period is \$4,628,782 but the expense is spread over a twelve-year period, because it takes four years to educate a dentist.

²See Table 7.22.

³See Table 7.24.

allow only for the treatment of the incidence of dental caries. There has to be some estimation of the number of dentists required to treat the prevalence of untreated dental caries in 1971.

To give some idea of the scale of the project necessary to treat dental caries of children in Ontario, we note the following. According to the CDA, the capacity of the dental school at the University of Toronto was 125 in 1961 (this was the result of an expansion in the years 1958-1961, for previously they could graduate only sixty-five).⁶⁵ This number is not adequate to treat children's caries, even if all the graduating dentists stay in Ontario and treat children only (see Table 7.23). On January 1, 1965, however, a new school was officially established at the University of Western Ontario.⁶⁶ According to the Royal College of Dental Surgeons, in 1966 there were 2,616 dentists in Ontario.⁶⁷ Even given the annual 125 graduates from the University of Toronto and fifty-two from the University

⁶⁵Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*, Appendix XX, pp. 2-3.

⁶⁶W. J. Dunn, "Report of the University of Western Ontario, Faculty of Dentistry", *Report on the Proceedings of the Royal College of Dental Surgeons of Ontario Annual Meeting*, 1965, Toronto, 1965, p. 34.

⁶⁷Royal College of Dental Surgeons of Ontario, *Report on Proceedings of Annual Meeting*, 1966, Toronto 1966, p. 101.

of Western Ontario,⁶⁸ and no attrition, the total number of dentists in Ontario in 1971 will be only 3,501 (2,616+855); this is far short of the projected requirement of 5,100 for children's caries only. In fact, the CDA estimates that there will be only 7,700 dentists for all of Canada.⁶⁹ Even if the 5,100 dentists were obtained for 1971, it would take all of, or more than, the number of dentists that Ontario can presently graduate per year ($125 + 52 = 177$) to service children's caries alone on a continuing basis (see Table 7.22).

Cost to the student. Paynter includes in his study a table which summarizes most of what needs to be said about the cost to the student⁷⁰ (one should note that the dental course has a high proportion of out-of-town students). We have reproduced this table as Table 7.27 in our text.

TABLE 7.27
Estimated Average Cost to Students, Dental Education in Canada, 1961-1962

Predental: tuition	572	
textbooks	92	
supplies	33	
incidentals	75	
Subtotal university expenditure	—	772
Room and board		1,164
Total predental		1,936
Dental: tuition (4 x 475)	1,900	
instruments, books, supplies, etc.	1,680	
Subtotal university expenditure	—	3,580
Room and board		3,043
Total dental	—	6,623
GRAND TOTAL		8,559

SOURCE: K. J. Paynter, *Dental Education in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 38.

The Dental Health Nurse

Assuming, as we have before, that we will need no more dental health nurses than dentists, we now know the number of dental health nurses required. Again we must estimate the attrition rate including net emigration, the failure rate, and the number of graduates who will stay in Ontario before we can look into the cost of educating the required number of graduates.

Attrition. In his study Fulton includes a table showing the attrition of the dental health nurses in New Zealand for the period 1937 to 1948.⁷¹ Of the

⁶⁸Royal College of Dental Surgeons of Ontario, *Report 1965*, p. 39.

⁶⁹Canadian Dental Association, Brief to the Royal Commission on Health Services, *op. cit.*

⁷⁰K. J. Paynter, *op. cit.*

⁷¹J. T. Fulton, *op. cit.*, p. 54.

880 total graduates, 325 had left the service by March of 1949.⁷² This represents 37 per cent over the period, or approximately 3 per cent per year. What is more interesting, we feel, is the average length of time each graduate nurse spent in service. Of every 100 nurses, thirty would have resigned within five years, fifty by seven years, seventy by ten years, and eighty-three by twelve years.⁷³

This attrition rate was estimated for a foreign country for a period of years that is not exactly current. However, there is good reason to expect that the attrition rate for women nurses would be higher than men and the 3 per cent figure probably then would be conservative. But note that this rate is not markedly higher than the 2.45 per cent for dentists noted earlier. We have therefore accepted it as a rough approximation to make our estimations in Table 7.28.

TABLE 7.28
Estimated Number of Dental Health Nurse Graduates Required Each Year

Year	Estimated No. of Nurses Required	Estimated Attrition	Required Increase ¹	Total Graduates Required
1970	5,056	152		
1971	5,100	153	44	196
1972	5,146	154	46	199
1973	5,194	156	48	202
1974	5,245	157	51	207
1975	5,291	159	56	213
1976	5,333	160	42	201
1977	5,380	161	47	207
1978	5,430	163	50	211
1979	5,489		59	222
Total				1,858

¹See Table 7.19.

Failure rate. Fulton stated that in the period 1937-1947, in New Zealand, 87 per cent of the entering students completed their training, although only 74 per cent did it in the regulation two-year period. Another 11 per cent took two and a half years and 2 per cent took three years of training.⁷⁴ In Table 7.29 we have assumed the failure rate to be 13 per cent over the two-year period, with 6.5 per cent failing the first year.

Graduates practising in Ontario. In New Zealand the dental health nurse is a public servant and cannot practise outside government employment. If, in

⁷²*Ibid.*

⁷³*Ibid.*

⁷⁴*Ibid.*

TABLE 7.29

Total Required Enrolment in Dental Schools in Ontario, 1971-1979

Year	Required No. of Graduates in Service ¹	Course Yr. 2 106.5 % of Graduates	Course Yr. 1 6.5 % of Year 1	Total
1969				
1970			223	223
1971	196	209	226	435
1972	199	212	229	441
1973	202	215	234	449
1974	207	220	242	462
1975	213	227	228	455
1976	201	214	234	448
1977	207	220	240	460
1978	211	225	251	476
1979	222	236		236

¹See Table 7.28.

adopting the institution of dental health nurses, Ontario accepts this rule, there will be no problem of graduates practising elsewhere. Thus one problem is momentarily solved.

Cost to the institution. Paynter assumes that the annual cost of educating a dental hygienist is similar to that of educating a dentist.⁷⁵ This may not be a valid assumption, for an intensive study of costs would probably reveal that the nurse would be a little less expensive to educate. However, on this assumption we can estimate the cost per dental nurse to be \$5,735 per nurse per year and thus derive estimations for Table 7.30.

Cost to the student. Again we shall assume the annual cost to the student to be the same as that for the dental student; but since the nurse trains only two years, the total cost will be halved. Thus we derive the data in Table 7.31.

Cost of Instituting the Program

There is still one rather large expenditure. To this point, we have determined only the cost of keeping the program supplied with an adequate number of personnel once it has been initiated. However, we still need 5,100 personnel to start the program. Not counting the predental university year, it will cost the institution \$22,940 (\$5,735 x four years) to educate the dentist, or \$11,470 (\$5,735 x two years) to educate the dental health nurse. Even if we do not allow for failures and drop-outs, it will cost the institutions \$116,994,000 to educate the dentists or \$58,497,000 to educate the dental health nurses. The cost to the students will be \$43,650,900 for the dentists or \$16,891,000 for the dental health nurses.

⁷⁵K. J. Paynter, *op. cit.*, p. 87.

TABLE 7.30**Total Cost Borne by the Institution to Educate Dental Health Nurses per Year for Services Between 1971 and 1979¹**

Year	Number of Students Required ¹	Cost Per Student ²	Total
1970	223	\$5,735	\$ 1,278,905
1971	435		2,494,725
1972	441		2,529,135
1973	449		2,575,015
1974	462		2,649,570
1975	455		2,609,425
1976	448		2,569,280
1977	460		2,638,100
1978	451		2,586,485
1979	236		1,353,460
Total	4,060	\$5,735	\$23,284,100

¹The average expense per year is \$2,587,122.²See Table 7.29.³See Table 7.25.**TABLE 7.31****Estimated Average Cost to Students, Dental Health Nurse Education in Canada¹**

Tuition (2 x 475)	\$950
Instruments, books, supplies, etc.	840
Subtotal university expenditures	\$1,790
Room and board	1,522
Total cost	\$3,312

¹See Table 7.27.

Remember, too, that the costs of both instituting and maintaining the program do not allow for the prevalence (but only for the incidence) of untreated caries within that period.

Cost of Educating Personnel

Detailed estimates of the costs of education are presented in Appendix III. For present purposes, a summary of these estimates is presented in Table 7.32.

Given our assumptions, the estimates obtained indicated the expected high costs associated with use of the dentist rather than of the dental health nurse. Recalling that we have assumed the same productivity, approximately the same attrition and failure rate, and the same education costs per program year for both

TABLE 7.32
Summary of Costs for Dentists and Dental Health Nurses
(dollars)

	Dentist	Dental Health Nurse
Cost per graduate to institution (5 x 5,735) ¹	28,675	11,470
Cost of instituting program (educating the personnel only) (5,100 x 28,675) ²	146,242,500	58,497,000
Cost of maintaining required number of personnel (5/4 x 4,628,782) ³	5,785,978	2,587,122
Cost of graduating per graduate ⁴	8,559	3,312
Total cost to the graduates (a) to institute the program (5,100 x 8,559) (5,100 x 3,312) (b) to maintain it (8,559 x 1,600) (3,312 x 1,858) ⁵	43,650,900	16,891,200
Foregone earnings of graduates per graduate (5 x \$4,000) (2 x \$4,000) ⁶	20,000	8,000
Foregone earnings for all graduates (20,000 x 1,600) (8,000 x 1,858)	32,000,000	14,864,000

¹Cost per graduate to the institution was estimated by multiplying the cost per student per year times the number of courses. In the case of the dentist we assumed the cost for the preclinical year to be the same as the dental years. This assumption will give us only a rough approximation. Therefore, the cost of a dentist's education is 5 x \$5,735 and the cost of the dental health nurse's is 2 x \$5,735.

²Table 7.19 shows that to initiate the program in 1971 approximately 5,100 personnel will be needed.

³See Tables 7.26 and 7.30.

⁴See Tables 7.27 and 7.31.

⁵It is estimated that Ontario will have to graduate 1,600 dentists (see Table 7.22) and 1,858 dental health nurses (see Table 7.28). These figures do not include the cost borne by students who failed to graduate. However, the relative size of the total cost is correct, for the failure rate and attrition rate together are about the same for the two professions.

⁶Foregone earnings are the earnings (\$4,000 per year) that we estimate the high school graduate could earn on the average each year if he were not in university.

the dentist and the dental health nurse, one expects the main determinant of relative costs of education to be the relative length of the two courses. Thus, we expect the cost of educating dental health nurses to be approximately two-fifths the cost of educating dentists.

The estimated foregone earnings also are relevant. We expect these students could contribute \$32,000,000 and \$14,864,000, for dentists and dental health nurses respectively, in the production of other goods or services in the economy

if they were not students. This estimate is based on the assumption that a high school graduate could earn approximately \$4,000 a year for his first five years out of school.

Conclusion

The results of this study indicate that the dental health nurse is a less costly alternative than the dentist for rendering the services necessary to care for the dental caries of the children in Ontario on a universal basis. This conclusion was in a sense predetermined when we chose to consider a program that involved job functions requiring the competence and acquired abilities of a dental health nurse, rather than the additional abilities of a dentist. Because their educational program is longer and more costly, and thereby the annual income required to compensate them for services is rendered higher, dentists are shown to be by far the more expensive alternative. Further, because we have attempted to hold constant the quality of service rendered, dentists represent the less efficient alternative.

Our conclusion should be viewed with caution, however. First, the quality of the data used is open to question. All that can be said about the results, using the data that we did, is that they give some idea of the absolute costs of providing universal care for children's caries and some idea of the relative costs of the two alternatives studied.

Second, we have no way of knowing whether the people of Ontario actually want universal care for caries of their children's teeth. In fact, we suspect that people are not willing to go to the necessary expense to care completely for children's caries. It must be remembered that dental caries are only one of many dental diseases or deformities, and that there are other people in the world besides children under sixteen years of age. Moreover, many people are not concerned about care of deciduous teeth.

Third, even granted that the people actually want complete care of children's caries, we do not know whether the proposed care program, the proposed personnel, or the proposed organization of personnel are optimum. That is, we investigated only two alternatives: either all dentists or all dental health nurses. It is possible that some combination of the two, or some other alternatives, would be preferable. In addition, our assumptions about equal attrition and failure rates are open to question. Similarly, the assumption about equal productivity would have to be subjected to more rigorous analysis.

Finally, because of his more extensive training, the dentist might be more flexible in adapting his practice to technological change.

To reach a conclusion as to the usefulness of the dental health nurse in Ontario, we would need to know not only the amount of each type of service that will be demanded with respect to the universal care of children's caries, but also this information for every other type of dental disease. In fact, the overall

optimum mix of human dental care resources involves several personnel, each providing services for the various diseases.

Thus, our first conclusion is that a thorough study of all dental care needs, of alternative methods of caring for each need, of related job functions, and of the ability of various dental care personnel to perform these job functions is required before the optimal mix of dental care resources can be determined. Such a study would involve a more intensive and extensive expansion of the study whose results are presented in this chapter.

Our second conclusion is that there appears to be sufficient evidence to suggest that the dentist, and the dentist alone, is *not* the most efficient human dental care resource for the provision of dental care for dental caries in preschool and school-aged children. More positively, the introduction of the dental health nurse into the dental care team can be expected to yield large-scale benefits, both to individuals responsible for the dental care of their children (and themselves) and also to governments charged with the responsibility of providing dental care for children.

Chapter 8 Obstetrical Care: Midwife Versus Obstetrician

In this chapter, as in the last, the problem we are considering relates to the nature of the health care resource that is trained to provide a particular set of health services. Specifically, for prenatal, delivery and confinement, and postnatal care, is there some combination of midwives and obstetricians that could provide more efficiently the same level of care that is now being provided by a mixture of general practitioners, obstetricians and nurses who have no specific training in midwifery but who happen to be on duty in maternity wards at crucial moments? More generally, might the existing institutional framework of licensing procedures and accompanying educational requirements be changed to permit the training and use of midwives in such a way that a given quality of health care could be provided at lower cost than is presently the case?

Before looking at this problem directly, we present some information on what appears to be the level of obstetrical care presently being received by mothers in Ontario. We then outline the principal direct causes of infant and maternal mortality, and some of the general factors affecting these levels of mortality.

"The word obstetrics is derived from the latin verb 'obstare' which means 'to stand in front of' and by implication 'to protect'."¹ "The viewpoint that this branch of medicine has to do with protecting the expectant mother throughout her course is a most important one . . . for obstetrics is very largely concerned with *preventing* possible dangers and hence is very truly a phase of preventive medicine."²

As in most fields of medicine, the boundaries between obstetrics and its allied fields are hazy. "The subject of obstetrics has in its scope not only the care of the patient throughout the maternity cycle but also a vision of the foundation of the health of generations to come."³ In its widest sense it involves not only care of the maternity cycle throughout a woman's reproductive life from puberty to menopause, but also such matters as guidance in parent craft, help with infertility and family planning, and health supervision of the adolescent girl (which includes the

¹M. E. Davis and R. Rubin, *Obstetrics for Nurses*, W. B. Saunders Company, Philadelphia, 1962, p. 1.

²L. Zubriskie and N. J. Eastman, *Nurse's Handbook of Obstetrics*, J. B. Lippincott Company, Montreal, 1948, p. 2.

³*Ibid.*, Preface to Eighth Edition.

physical, mental and nutritional aspects of health). In this sense, the field of obstetrics could and should have many types of trained personnel besides the obstetrician. It is argued by many that midwives, for example, are not competitive with, but rather complementary to, obstetricians.

Obstetrics in the narrower sense and as it is more commonly thought of by the public would be defined as follows: "Obstetrics is the art and science of caring for the child-bearing woman and her new-born baby. It deals essentially with three distinct periods: pregnancy (from time of conception to the beginning of labour); labour (the process by which the baby and placenta are expelled from the mother's body into the outside world); and the puerperium (the period during which the organs of reproduction are restored to their former size and condition)."⁴

In this study we restrict ourselves primarily to this narrower concept.

The general goal of obstetrics is to raise and maintain the health of the mother and her baby during the reproduction process. There are essentially four goals:

- 1) To prevent death.
- 2) To minimize disease and deformity.
- 3) To minimize the pain and discomfort of childbirth.
- 4) To prepare the mother and the entire family for childbearing.

Just how well these goals have been met in Canada, especially in Ontario, under the present method of providing obstetrical care is the question we will now consider.

International Comparisons of Mortality Rates

To make international comparisons of the level of obstetrical care, we examine various rates of mortality. We do this principally for two reasons: first, the level of mortality should be a fairly good indicator of the overall level of obstetrical health in any country; and second, comparatively objective data are available. We have selected seven countries to compare with Canada and Ontario, all of which have several common characteristics. Each has had a relatively stable government, except during the war years; they have all shared common industrial expansion which had its beginnings in the nineteenth century; all were deeply affected by the great depression of the 1930's; since the war they have experienced a rising standard of living; their populations are predominantly white and have been growing at a similar rate since the war; all but two of the countries (Australia and New Zealand) are in the northern temperate zone, and all are subject to pronounced climatic seasonal variations. Their population densities range from the concentrated area of

⁴*Ibid.*, p. 1.

England and Wales to the relatively sparse population areas of Canada and Australia.⁵

There are several measures of infant deaths including infant mortality, neonatal, postneonatal and perinatal mortality. All of these are useful as a measure of the level of obstetrical health in a country, but we shall look at infant mortality — “the mortality of live-born children who have not yet reached their first birthday”.⁶

The infant mortality rate usually is expressed as the number of deaths per 1,000 live-births. The key word is “live-birth”, and there are different interpretations of its meaning. In 1950, the Third World Health Assembly adopted a recommendation of the Expert Committee on Health Statistics for the following definition:

Live-birth is the complete expulsion or extraction from its mother of a product of conception irrespective of the duration of pregnancy, which, after separation, breathes or shows any sign of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of the voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live-birth.⁷

Sweden did not adopt this definition until 1959, and Denmark even yet has no official definition of live-born.

Despite this problem of definition, the differences in the various national rates are consistent enough for comparison. For example, it has been estimated that the British data for 1946-1947 decreased the level of infant mortality by 1.5 per cent and increased the corresponding figure for stillbirths by 3 per cent when the definition of live-born was restricted to breathing only. Even in this case, there is a problem as to whether “breathing” means a single gasp of breath or regulated breathing for a short interval.⁸

As a measure of the general level of obstetrical care, the infant mortality rate has two main advantages. First, since it is a rather popular measure throughout the world, an abundance of comparable data is readily available. Second, although obstetrical complications may be the primary cause of death, death itself may not occur immediately around birth. Thus a measure such as infant mortality will catch these later deaths.

⁵U.S. Department of Health, Education and Welfare, Public Health Service, *International Comparison of Perinatal and Infant Mortality: The United States and Six West European Countries*, Public Health Service Publication #1000 Series 3-#6, United States Government Printing Office, Washington, D.C., March 1967, Ch. 1.

⁶DBS, *Infant Mortality, 1950-1964*, Catalogue Nos. 84-524, Queen's Printer, Ottawa, 1967.

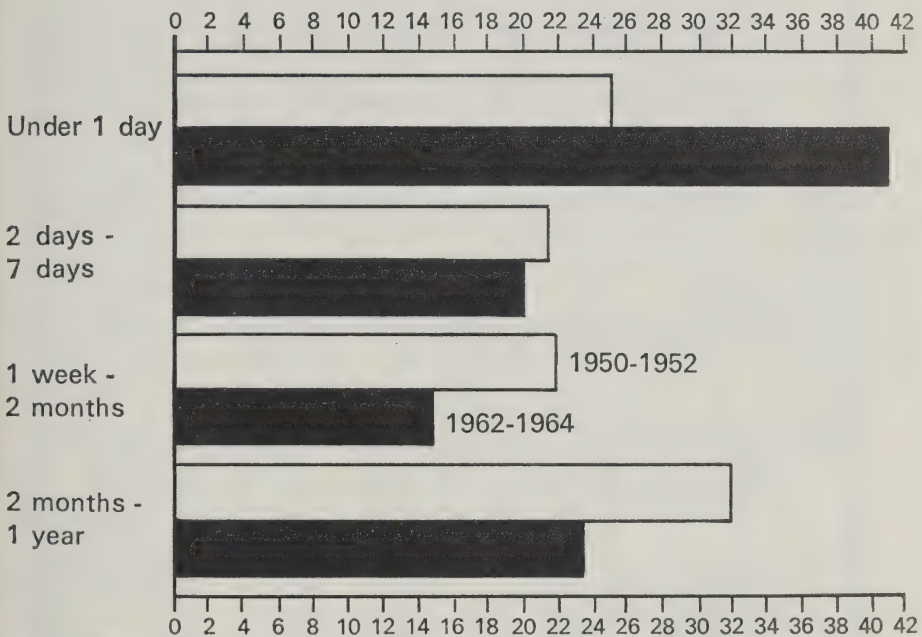
⁷U.S. Department of Health, Education and Welfare, Public Health Service, *op. cit.*, p. 9.

⁸*Ibid.*

On the other hand, there are two chief disadvantages. First, this measure ignores the number of foetal deaths which are almost entirely the responsibility of obstetricians. But in any event, as can be seen from Figure 8.1, most infant deaths occur within the early neonatal period (defined as within twenty-eight days of birth). Second, some of the deaths recorded in the infant mortality rate may not be due to obstetrical complications.

Data on infant mortality rates in eight countries and Ontario, and their rankings, are presented in Table 8.1 and Figure 8.2.

Figure 8.1. Percentages of infant deaths by age at death, Canada, 1950-1952 and 1962-1964



SOURCE: DBS, *Infant Mortality, 1950-1964*, Catalogue Nos. 84-524, Queen's Printer, Ottawa, 1967, Chart F, p. 57.

(The U.S.A. has been divided into three categories: total, white and non-white.) Several points can be gleaned from Table 8.1. First, over the entire period the same countries occupied the top four rankings, with some shuffling among them, except for the war years when Norway dropped drastically to the ninth ranking (from 1948 on it was again in the top four). (Notice that all the countries that were usually below the fourth ranking increased this ranking so that they compensated for Norway's tremendous drop.) Other than Norway, only Ontario and Australia fell in rank relative to the other countries during the war years; but in these two cases the decline seems to be part of a trend, rather than a direct result of the war.

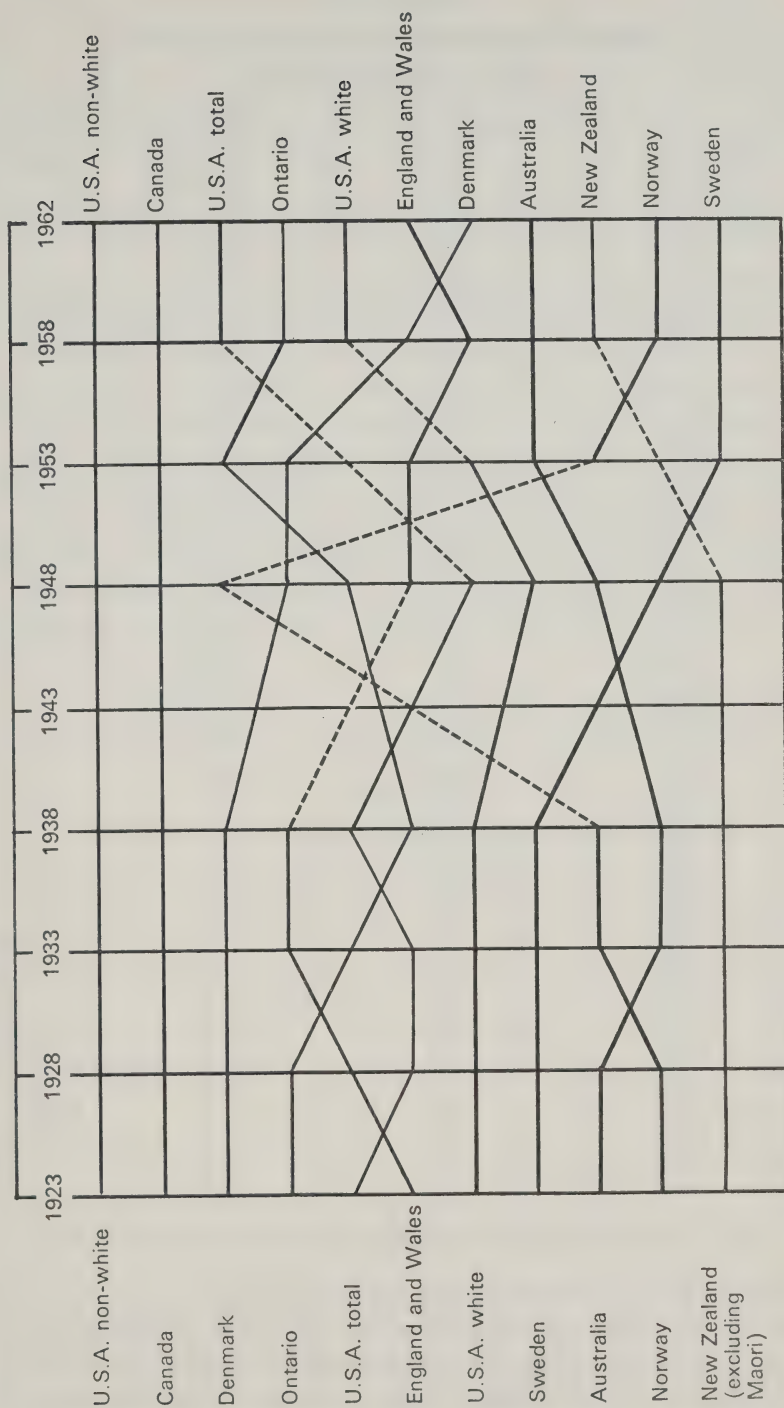
TABLE 8.1
Infant Mortality Rates, 1923-1962 at Five-Year Intervals, and their Ranks
 (per 1,000 live-births)

Countries and Provinces	1923 1922-24		1928 1927-29		1933 1932-34		1938 1937-39		1948 1947-49		1953 1952-54		1958 1957-59		1962 1961-63	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
Australia	56.8	3	52.8	3	41.5	2	38.2	2	27.2	3	23.2	4	21.1	4	20.0	4
Canada	99 ¹	10	94 ²	10	72.7	10	66.6	10	44.4	10	35.2	10	29.8	10	27.4	10
Ontario	82.8 ¹	8	74.1 ²	8	60.9 ³	7	50.3	6	36.2	7	28.3	9	24.6	8	23.0	8
Denmark	84.0	9	81.6	9	68.1	9	61.0	9	36.7	8	27.7	8	22.8	6	21.0	5
England and Wales	72.7	6	69.2	7	62.2	8	53.7	8	35.9	6	26.6	6	22.6	5	21.6	6
New Zealand																
excl. Maori	42.0	1	36.3	1	31.6	1	32.6	1	23.6	1	20.6	2	19.8	3	18.6	3
Norway	51.6	2	49.5	2	44.8	3	39.4	3	37.5	9	22.4	3	19.7	2	17.8	2
Sweden	59.7	4	57.6	4	50.1	4	41.9	4	24.0	2	19.3	1	16.8	1	15.6	1
U.S.A.																
White	71.2	5	62.6	5	53.5	5	47.2	5	29.6	4	24.9	5	23.4	7	22.4	7
U.S.A.																
Non-White	113.1	11	102.8	11	90.6	11	78.8	11	47.4	11	44.9	11	44.5	11	41.1	11
U.S.A.																
Total	74.7	7	67.0	6	58.6	6	51.1	7	31.8	5	27.6	7	26.6	9	25.3	9

¹1921-1925.²1926-1930.³1931-1935.

SOURCE: R. D. Fraser, "Infant Mortality: Causes and Cures", an on-going project, DBS, *Vital Statistics* (Ontario), Queen's Printer, Ottawa, 1965.

Figure 8.2. Ranks of selected countries and Ontario by infant mortality, 1923-1963



SOURCE: Derived from Table 8.1.

TABLE 8.2
Maternal Death Rate for Canada and Ontario
(per 10,000 live-births)

	Canada	Ontario
1921-1925	50.1	54.1
1926-1930	56.4	57.9
1931-1935	50.5	53.0
1936	56.2	56.8
1937	48.6	51.7
1938	42.9	38.3
1939	42.6	43.0
1940	40.1	37.1
1941	36.4	30.3
1942	30.5	26.3
1943	28.5	23.3
1944	27.8	25.4
1945	23.0	21.7
1946	18.1	16.4
1947	15.8	11.9
1948	15.0	12.0
1949	14.7	12.6
1950	11.4	8.9
1951	10.7	8.4
1952	9.3	8.1
1953	7.8	5.3
1954	7.2	5.1
1955	7.6	5.8
1956	6.2	4.9
1957	5.4	3.6
1958	5.6	4.6
1959	5.5	4.6
1960	4.5	3.5
1961	4.6	4.2
1962	4.1	3.5
1963	3.5	3.0
1964	3.0	2.8
1965	3.2	3.1

SOURCE: DBS, *Vital Statistics 1952-1965*, Queen's Printer, Ottawa, 1965.

Second, Canada has ranked consistently tenth in this group, with the highest mortality rate of all the countries considered; only the non-white population of U.S.A. has a higher rate. Although one could argue that Canada's relative position could be improved by comparing its infant mortality with that found in countries

other than the ones we have chosen, this would not alter the fact that its rate is higher than that of many industrialized countries who do not have as high a standard of living. Although its infant mortality rate is consistently below Canada's, Ontario is not much better off. It started off the period of analysis in eighth place and, after improving its relative position for a number of years, again slipped back to eighth place in 1962.

Third, although the rankings of all the countries have remained fairly stable, the gap between the highest and the lowest rates seems to have narrowed.

Fourth, there seems to be an overall international pattern in the movement of the rates. One hypothesis that might explain this is the probable rapid spread of medical knowledge throughout these well-developed countries.

Although the data for maternal deaths are not as complete as for infant deaths (see Table 8.2), the same general overall pattern emerges. The maternal mortality rates have been falling rather quickly and relatively consistently, from 50.1 deaths per 10,000 live-births for Canada and 54.1 for Ontario in the 1921-1925 period to 3.2 and 3.1 deaths in 1965 for Canada and Ontario, respectively. We suspect that this reflects the general international pattern, at least for the industrialized nations. One obvious conclusion that can be reached from observing the data is that historically we have not been losing as many mothers as we have children. It is interesting to note also that until the 1940's the Ontario rate was actually higher than the Canadian.

International comparisons can be made with the data shown in Table 8.3.

TABLE 8.3
Maternal Mortality in Selected Countries and Ontario
(per 10,000 births)

	1951	1953	1955	1957	1959	1961	1963	1965
Australia	11	6	6	6	5	—	2.7	—
Canada	10.7	7.8	7.6	5.4	5.5	4.6	3.5	3.2
Ontario	8.9	5.3	5.8	3.6	4.6	4.2	3.0	3.1
Denmark	—	8	5	40	4	2	—	—
England and Wales	—	8	7	50	4	3	3.0	2.5
New Zealand	—	5	4	—	4	—	4.0	—
Norway	10	7	7	5	4	—	2.0	—
Sweden	9	6	5	4	2	—	2.7	—
U.S.A.	—	—	5	4	4	3	4.0	—

SOURCE: DBS, *Vital Statistics, 1952-1965*, Queen's Printer, Ottawa, 1965.

Although rather sketchy, these data suggest that Canada has not been doing well in this area either. Ontario, on the other hand, seems to rank relatively high. Note that differences in maternal mortality among countries are not nearly as great as those in infant mortality, and the absolute size of the maternal rates is

considerably smaller. Maternal mortality is probably not as good a measure of obstetrical health as infant mortality; first, because the data are not as consistent from country to country as they are for infant mortality; second, maternal death is probably much less directly attributable to obstetrical care; and third, maternal mortality is probably much more dependent on the health of, and the care given to, the mother in years prior to the year of birth than is the case for infant mortality.

Causes of Obstetrical Morbidity and Mortality

From observing the level of mortality and the differences in the level among countries, one wonders what are the causes of death and whether they vary from country to country. In this subsection we will look at some of the direct causes of death, and in the next we will consider some of the more general determinants of levels of mortality.

There are many diseases and deformities, including those of the mind, which can affect either the child or the mother, or both. Detailed discussion of all of these would be a study in itself, and it is not really essential for the purposes of this chapter. We do, however, look at some of the principal causes of death.

The Dominion Bureau of Statistics has listed the causes of infant death as follows:

- 1) Immaturity with mention of any other subsidiary condition.
- 2) Intracranial and spinal injury at birth, and other birth injury.
- 3) Postnatal asphyxia and atelectasis.
- 4) Congenital malformations.
- 5) Pneumonia.
- 6) Gastro-intestinal diseases.
- 7) Inhalation and ingestion of food, and accidental mechanical suffocation.
- 8) Erythroblastosis.
- 9) Influenza.
- 10) Bronchitis.
- 11) Meningitis, except meningococcal and tuberculosis.
- 12) Neonatal disorders arising from certain diseases of the mother during pregnancy.
- 13) Haemorrhagic disease of the newborn.
- 14) All other causes.⁹

Table 8.4 gives the infant mortality rate for each of these causes for Canada from 1950 to 1962.

From 1950 on, the three top causes of death have been immaturity, congenital malformation and pneumonia. Together they have been responsible for 41.0 per cent to 47.4 per cent of all infant deaths. The top six causes of death remained the same over these years, with the exception of 1962 when suffocation

⁹DBS, *Infant Mortality 1950-1964*, *op. cit.*

TABLE 8.4
Secular History of the Causes of Infant Mortality in Canada
(per 10,000 live-births)

	1950		1953		1956		1959		1962	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
All Causes	415.1	—	255.6	—	319.5	—	283.7	—	277.5	—
Immaturity	61.6	1	53.8	1	49.3	2	49.4	1	49.1	1
Injury at birth	42.8	4	34.1	4	34.3	5	29.2	5	28.5	5
Asphyxia and atelectosis	29.0	6	31.6	5	36.4	4	32.0	4	31.4	4
Congenital malformation	49.9	3	51.8	2	51.3	1	44.8	2	47.5	2
Pneumonia	58.6	2	50.4	3	46.9	3	38.5	3	34.9	3
Gastro-intestinal disease	29.8	5	23.6	6	14.2	6	12.9	6	9.6	7
Suffocation	9.8	7	8.5	8	8.7	7	9.6	7	9.8	6
Erythroblastosis	8.0	9	8.1	9	7.4	8	7.9	8	7.2	8
Influenza	8.2	8	8.7	7	3.7	9	3.7	9	2.1	10
Bronchitis	3.0	12	2.8	13	3.4	10	2.2	11	1.8	12
Meningitis	4.4	11	3.4	12	3.1	11	1.7	13	2.0	11
Maternal toxemia	5.7	10	4.3	10	3.0	12	2.5	10	2.3	9
Haemorrhagic diseases	2.8	13	3.6	11	2.4	13	2.2	12	1.8	12
All others	101.6	—	70.9	—	55.2	—	47.0	—	47.7	—

SOURCE: Derived from DBS, *Infant Mortality, 1950-1964*, Catalogue Numbers 84-524, Queen's Printer, Ottawa, 1967.

TABLE 8.5
Causes of Infant Mortality in Selected Countries and Ontario, 1962, Ranked by Cause in Each Country

	Australia	Canada	Denmark	England Wales	New Zealand	Norway	Sweden	U.S.A.	Ontario									
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank									
All causes	204.1	—	275.5	—	200.6	—	216.8	204.4	177.3	154.3	253.1							
Immaturity	36.0	2	49.1	—	31.4	3	35.6	2	24.7	3	38.9	—	45.3	—	50.8	—		
Injury at birth	29.1	3	30.6	5	23.1	4	22.2	5	22.6	4	17.7	3	25.1	4	22.7	5	25.5	4
Asphyxia and atelectosis	26.7	4	31.4	4	42.3	2	31.9	3	18.9	5	16.7	4	29.4	3	44.9	2	30.6	3
Congenital malformation	38.5	1	47.5	2	43.1	—	45.8	—	38.5	—	38.9	2	31.1	2	35.6	3	43.1	2
Pneumonia	18.6	5	34.9	3	9.3	5	31.1	4	36.1	2	16.7	5	7.8	5	28.9	4	22.2	5
Gastro-intestinal diseases	5.0	7	9.6	7	3.5	7	5.4	6	7.5	6	4.2	6	1.7	8	6.6	6	4.1	8
Mechanical suffocation	4.3	8	9.8	6	1.9	8	4.9	8	2.9	9	4.2	7	1.9	2	5.6	7	10.9	6
Erythroblastosis	5.5	6	7.2	8	4.2	6	4.2	9	5.5	7	1.6	8	2.1	6	4.8	8	6.2	7
Bronchitis	1.1	10	1.8	10	1.2	10	4.9	7	2.3	10	0.8	9	1.0	10	1.4	10	1.8	9
Meningitis	2.4	9	2.0	9	1.7	9	1.9	10	3.7	8	0.6	10	1.1	9	2.2	9	1.5	10
Others	37.2	—	51.7	—	39.1	—	29.0	—	51.6	—	37.1	—	18.5	—	55.2	—	—	—

SOURCE: Derived from DBS, *Infant Mortality, 1950-1964*, Catalogue Nos. 84-524, Queen's Printer, Ottawa, 1967.

replaced gastro-intestinal disease for sixth rank. These top six have been responsible for 65.5 per cent to 72.5 per cent of all infant deaths. If 1962 can be considered as representative, the situation is much the same in other countries (see Table 8.5).

The countries are ranked for each cause of death in Table 8.6. Again, it can be seen that Canada and Ontario do not rank very high.

Maternal mortality is the death of the mother during pregnancy, labour or puerperium, and it is usually expressed as the number of deaths per 10,000 live-births. The three chief causes of maternal death are puerperium infection (sepsis), toxemia and haemorrhage. There are other complications, such as abortions or ectopic (generally fallopian tube) pregnancy, but in these cases death almost invariably results from sequellae haemorrhage or puerperium infection. And other deaths may be attributed to heart disease, anaesthesia accidents, (more rarely) embolism due to thrombophlebitis, disease of the urinary tract, and venereal disease.¹⁰

General Determinants of Maternal and Infant Mortality

Knowledge of the medically diagnosed causes of death is not by itself sufficient if we wish to improve the level of obstetrical care. In addition, we must know the type and amount of curative and preventive treatment that is necessary to minimize morbidity and mortality from morbidity cases. And this type of care must be related directly to particular environments.

There are in fact many interrelated factors which contribute to the incidence of obstetrical complications. It is our contention that, to a great extent, the variation in levels of mortality can be explained by variations in the general determinants. Thus, if the nature and structure of effective obstetrical care is to be determined, a thorough investigation of the relationships between the general determinants of the causes of morbidity and mortality is required.

The following are some of the general determinants of infant and maternal health. Their precise influence on health has yet to be determined. Although there is some information on the value of controlling or modifying the effects of some of these general factors, such information is far from complete.

- 1) *Income*. The influence of income is all-pervasive, for it affects not only the ability to pay, but the desire to demand services and the ability to develop ways of overcoming obstacles presented by other general factors.

¹⁰M. E. Davis and R. Rubin, *op. cit.*, pp. 5-7, 241-352; and L. Zubriskie and N. J. Eastman, *op. cit.*, pp. 4-9, 200-257, 381-402, 467-479.

TABLE 8.6
Causes of Infant Mortality in Selected Countries and Ontario, 1962,
Ranked by Country for Each Cause¹

	All causes	rank	Imma- turity	rank	Injury at birth	rank	Asphyxia and Atelectosis	rank	Congen- ital Malfor- mation
Australia	204.1	4	36.0	5	29.1	8	26.7	3	38.5
Canada	275.5	8	49.1	8	30.6	9	31.4	6	47.5
Denmark	200.6	3	31.4	2	23.1	5	42.3	8	43.1
England and Wales	216.8	6	35.6	4	22.2	2	31.9	7	45.8
New Zealand	204.4	5	24.7	1	22.6	3	18.9	2	38.5
Norway	177.3	2	38.9	6	17.7	1	16.7	1	38.9
Sweden	154.3	1	34.7	3	25.1	6	29.4	4	31.1
U.S.A.	253.1	7	45.3	7	22.7	4	44.9	9	35.6
Ontario			50.8	9	25.5	7	30.6	5	43.1

¹Where countries are tied, we have ranked them according to the second figure to the right of the decimal place.

- 2) *Education.* This factor, which tends to be highly correlated with income, can affect the quality of services supplied and demanded.
- 3) *Social class.* In modern society, this too is highly correlated with income and education; but each of the three exerts an independent influence.
- 4) *Payment of medical fees.* Medical insurance affects demand for, and thus the quality of, medical care.
- 5) *Types of employment.* This is especially important during pregnancy. For instance, a physically demanding job plus the extra work load demanded of the heart would predispose the woman to cardiac complications.
- 6) *Birth rate.* Perhaps the crucial factor is not so much the birth rate itself, but the absolute increase in the number of babies born per year. Although the absolute size of the population could minimize the effects of large increase, such an increase in the demand for obstetrical services and facilities in any one year might overutilize existing health care resources.
- 7) *Population density.* Whether or not an area is urban or rural has many implications for obstetrical morbidity and mortality. The net

Pneumonia	rank	Gastro-intestinal Diseases		Mechanical Suffocation		Erythroblastosis		Bronchitis		Meningitis		Others	
		rank	rank	rank	rank	rank	rank	rank	rank	rank	rank	rank	rank
18.6	4	5.0	5	4.3	5	5.5	6	1.1	3	2.4	8	37.2	4
34.9	9	9.6	9	9.8	8	7.2	9	1.8	6	2.0	6	51.7	7
9.3	2	3.5	2	1.9	2	4.2	4	1.2	4	1.7	4	39.1	5
31.1	8	5.4	6	4.9	6	4.2	3	4.9	9	1.9	5	29.0	2
26.1	6	7.5	8	2.9	3	5.5	7	2.3	8	3.7	9	51.6	6
16.7	3	4.2	4	4.2	4	1.6	1	0.8	1	0.6	1	37.1	3
7.8	1	1.7	1	1.9	1	2.1	2	1.0	2	1.1	2	18.5	1
28.9	7	6.6	7	5.6	7	4.8	5	1.4	5	2.2	7	55.2	8
22.2	5	4.1	3	10.9	9	6.2	8	1.8	7	1.5	3		

SOURCE: Derived from DBS, *Infant Mortality, 1950-1964*, Catalogue Nos. 84-524, Queen's Printer, Ottawa, 1967, p. 51.

effect may be positive or negative. Satisfactory determination of the net effect would require a more thorough study.

- 8) *Morals, culture, tradition.* These influences affect the value judgments of the individuals within a society; and the attitude of the general public can have a direct effect on a pregnant woman. Religion plays a large role in this field.
- 9) *Political events.* A stable government can affect attitudes towards children and thus can affect the birth rate. The lack of major political upheavals also can affect the general quality of medical care sought.

On a slightly different level is the attitude of the individual pregnant woman, perhaps more accurately called her "state of mind". Given social norms and values, a woman's attitude towards having a baby will depend on whether or not she feels the baby is going to enrich her life. Also the state of marital relations between a couple has a distinct effect on a pregnant woman's attitude. Davis and Rubin hold that the relationship between the attitude and the physiology of pregnancy is more important than any direct action taken by the woman to terminate her pregnancy.¹¹

¹¹M. E. Davis and R. Rubin, *op. cit.*, p. 25.

As one would expect, underlying ill-health of the mother is an important factor. This is particularly true of such problems as poor nutrition, anaemia, heart disease and venereal disease. A baby who is born prematurely primarily because of the ill-health of the mother is far more prone to death due to other causes than a mature baby at birth. It should be noted as well that the health of a mother is related to the overall health of the population, and this in turn is related to several other factors noted in this section.

Complications may be caused by ill-health, although they may be caused also by improper medical care, especially during the puerperium. By improper care we mean not only poor quality, but lack of, care. By complications we mean such difficulties as an improper positioning of the foetus or placenta during pregnancy and labour, or puerperium infection or haemorrhage of the mother.

Related to the last two factors is lack of cleanliness, contingent on the overall hygienic consciousness of the general public and on the measures taken by the medical staff to prevent infection. This factor is significantly connected with income, education and cultural background.

Such factors as the mother's age, parity (number of previous pregnancies), number of previous stillbirths, or caesarians all affect a woman's chances of having a normal pregnancy and a healthy baby. The probability of survival on the part of the mother and the child declines as the number of children per pregnancy rises.

The size of a woman's pelvic interior opening, through which the baby must pass, in relation to size of baby, her height and her size, has an important effect on the outcome of a pregnancy. It has been shown that a male baby or foetus is on the whole larger than the female, and thus is more likely to have a difficult delivery.

The chances of survival are slim for a baby that is born before twenty-eight weeks. And a premature baby is more prone to other disease and mortality until he is about four years old. The chance of acquiring a morbid disease decreases, however, as the baby grows older. This is especially true in the first year (see Figure 8.1).

The quality and amount of care rendered has a direct effect on the health of a mother and child. In this respect the medical organization — that is, the types of medical personnel available and the division of labour among them — does much to maximize the returns with a given amount of resources.

In Table 8.7 we present limited information on the relationship of infant mortality to some of the general factors that we have noted above. Note the consistency of the data between infant mortality and each of personal disposable income per capita, nurses per 10,000 persons, and housing stock per capita.

TABLE 8.7
Simple Correlation Coefficients, Ontario, 1946-1964

	Y_1	Y_2	Y_3	Y_4	Y_1	Y_2	Y_3	Y_4	Y_5
Y_1 Infant mortality ¹	—	.977	-.985	.955	-.903	-.770	-.130	-.173	-.798
Y_2 Standardized age-adj. death rate		—	-.986	-.972	-.926	-.831	-.122	-.224	-.860
Y_3 Life expectancy at birth			—	.982	.930	.830	.148	.176	.841
Y_4 Life expectancy at 40				—	.939	.865	.220	.254	.859
X^1 Personal disposable income					—	.937	.214	.331	.926
X_2 Nurses per 10,000 persons						—	.349	.298	.936
X_3 Physicians per 10,000 persons							—	.310	.306
X_4 Hospital beds per 1,000 persons								—	.210
X_5 Housing stock per person									—

¹Significant values of r : $P = .05$, $r = .456$; $P = .01$, $r = .575$.

SOURCE: R. D. Fraser, *Health, Health Services and Levels of Living in the Canadian Provinces, 1946-1964*, an on-going project.

Required Obstetrical Care and Related Job Functions

As in the last chapter, we restrict our analysis in this chapter to one possible level of obstetrical care. This level is universal and "complete" care; it is complete in that it includes every service thought to be necessary by a general consensus of the medical profession.

Once we know what job functions are thus involved, we evaluate the correspondence of job functions to possible types of health care personnel who are capable of carrying out these functions. And again, we further simplify our analysis by considering only two alternatives — namely, use of obstetricians and use of midwives.

Based on the wider definition of obstetrics at the beginning of this chapter, it would seem that an optimal care plan would have to consider every phase of care during the entire life of a woman or at least until she reached menopause. This would include regular check-ups (to look for any complications), educational programs (including aspects of hygiene, nutrition, morals, and so on), and curative treatment.

There are many types of health personnel besides the obstetrician and the midwife who could provide certain aspects of the required care and perhaps provide them more efficiently. Other members of the obstetrical "team" could be the general practitioners, obstetrical nurses, public health nurses, registered and practical nurses, physiotherapists, social workers, and religious counsellors. For convenience we shall arbitrarily define the role of the obstetrician and the midwife as being confined to postconceptional through to puerperium care (in fact, this may not be the optimal division of responsibilities).

Although in practice the responsibilities between these two types of personnel are divided differently in different countries, the underlying philosophy seems to dictate commonly that the midwife should handle all "normal" and the obstetrician all "abnormal" pregnancies. However, such a distinction between duties is not claimed by all, for most medical authorities argue that there are some services for the normal pregnancy which must be rendered by a physician. In addition, the definition of "normal pregnancy" is open to question. What degrees of seriousness, and for how long a duration, and how many complications must there be, before a pregnancy is considered abnormal? Davis and Rubin put it this way:

The assessment of normalcy is a medical responsibility. Limitations in cardiac or respiratory capacity, potentials for increased metabolic load on the thyroid, pancreas and kidneys and the adaptive adjustment for the expected changes in circulating blood volume and weight gain require competent medical judgement.¹²

¹²*Ibid.*, p. 93.

The problem of the division of responsibilities is more usefully attacked by examining the services required by a pregnant woman, and by attempting to allocate them among the personnel so that each service is provided as efficiently as possible. Recalling our discussion in Chapter 5, by this approach we attempt to ensure that job functions relate closely to natural and acquired abilities. We divide the required services according to three general stages: pregnancy, labour and delivery, and puerperium.

Every pregnant woman requires the following general services. (The abnormally pregnant woman would, of course, require some additional ones.) First, **there** must be a complete medical and obstetrical physical examination and **second**, there must be a complete obstetrical history taken of the patient and her family (mother, sisters, and so on). These two steps are necessary to determine the health of the pregnant woman and the probability of complications. Third, the woman must be educated about the physiology of reproduction, the proper care of her body (including such things as hygiene, nutrition and care of the breasts), the care of the new-born baby, and finally the psychological and sociological adjustments for which she and her family must be prepared. It is important for the emotional health of the family to educate the husband also and any other members of the family, and to allay any superstitions and fears. Fourth, obstetrical personnel must be able to recognize quickly any complications and must know what remedial action to take. Fifth, the personnel must be able to assist in delivery. Finally, the personnel must be a friend and confidant to the woman and her family during this time.

For prenatal care, Davis and Rubin recommend that a woman should visit her doctor every three or four weeks for the first two trimesters, every two or three weeks for the third trimester, until the last month or six weeks when the visits should be every week.¹³ This would mean approximately twelve to fourteen office visits. The Society of Obstetricians and Gynaecologists of Toronto says that office visits should be at four-week intervals for the first seven months and progressively more frequent during the last two months. "On the average, approximately ten visits are made occupying about three hours of professional care".¹⁴ But this frequency is partly a function of the organizational structure of the profession in the United States and Canada. In Great Britain, where midwives are employed, it is law that a woman visit a doctor twice, once near the beginning and once around the thirty-sixth week.¹⁵ In Russia, a woman has about eight to twelve visits in the prenatal period.¹⁶

¹³*Ibid.*, p. 88.

¹⁴The Society of Obstetricians and Gynaecologists of Toronto, Brief to the Royal Commission on Health Services, Toronto, 1962, p. 4.

¹⁵F. Brockington, "Letter from Great Britain—The Midwife in Great Britain", *Canadian Journal of Public Health*, Toronto, April 1952, Vol. XLII, p. 156.

¹⁶World Health Organization, *Maternal and Child Health in the U.S.S.R.*, Public Health Paper II, Geneva, 1962, p. 18.

Since in this study we are trying to estimate the relative costs of midwives compared to obstetricians in our own society, we accept the estimates of the Society of Obstetricians and Gynaecologists of Toronto.

The actual services rendered during these examinations can be divided roughly into two levels of competence. The higher level involves a complete physical examination, including a thorough examination by an obstetrician which must include a pelvic examination and routine smears of vaginal secretions such as Papanicolaou smears.¹⁷ We assume that two such examinations are necessary for a normal pregnancy, once near the beginning of pregnancy and once after the thirty-sixth week, as is the case in Great Britain.

The following required services can be performed by personnel with a lower level of competence:

- 1) Blood tests for syphilis, anaemia and the Rhesus factor. This should be done at least twice, once during the first visit and once more in the sixth or seventh week.¹⁸
- 2) Urine test for sugar and albumin content. This should be done at each visit.¹⁹
- 3) Blood pressure. This should be done at every visit.²⁰
- 4) Weight. This should be done at every visit.²¹
- 5) Temperature. In Great Britain it is law that a midwife notify a doctor if a patient's temperature rises to 100.4°F. for twenty-four hours or if it is above 99.4° on three successive days.²²
- 6) Height. This should be done once, preferably during the first visit.

If we assume that a physician sees the woman for two of the ten visits and spends thirty minutes per visit with her, which seems to be a generous allotment of time, there will then remain eight visits which could be handled by a midwife; these would involve a total of approximately two hours. Thus, a midwife could save two-thirds of a physician's time in examining a normally pregnant woman. This time could be increased if an obstetrician had a midwife working with him and if the midwife performed the lower-level competence services during the two office visits that the doctor supervised.

"The history of a patient's medical, surgical, and obstetrical experiences is important in assessing her present health and in guarding against possible dangers."²³ Information should be obtained on the familial history for such illness

¹⁷M. E. Davis and R. Rubin, *op. cit.*, p. 95.

¹⁸*Ibid.*, p. 90.

¹⁹*Ibid.*, p. 93.

²⁰*Ibid.*

²¹*Ibid.*

²²F. Brockington, *op. cit.*, p. 155.

²³M. E. Davis and R. Rubin, *op. cit.*, p. 93.

as tuberculosis, diabetes, cardiovascular disease, cancer and mental illness. Then a record should be made of various aspects of the patient's personal history, including childhood diseases, normalcy of menstruation (frequency, duration, age of onset and the presence or absence of dysmenorrhea). Her obstetrical history should contain such details as the number of other pregnancies, any complications during these pregnancies, and the outcome (that is, live or stillbirth, type and duration of labour, and puerperium period).²⁴ We assume that this task can be performed by the midwife in the two hours allocated to her.

The average length of pregnancy is 280 days from the first day of the last menstrual period (forty weeks); any birth before thirty-seven weeks gestation is considered premature and thus abnormal.²⁵ During this time the woman, even in normal pregnancy, undergoes tremendous physiological changes. If she is not aware of what is happening to her, she is subject to all types of fears and anxieties. It is extremely important that she have access to obstetrical personnel with the time, the knowledge and the patience to translate these changes from medical terminology into a language which the patient can understand.

In addition to being educated about physiological changes, the woman should be taught how to look after herself during the entire birth process. This education would involve such matters as diet, personal hygiene and exercise. It has been proven that good diet during pregnancy lowers the incidence of complications in pregnancy.²⁶ Because everyone's eating pattern is to a certain extent unique, it is desirable that each patient be prescribed a diet on an individual basis. Then proper allowance can be made for any special needs and for the preferences of the patient. Personal hygiene also is very important, as well as dental care, care of the breasts, techniques of washing (especially in the perinatal period), proper clothing and footwear and proper stature. Exercise is closely related to hygiene. This part of education involves not only the type of exercise necessary for health and appearance during both pregnancy and the puerperium period, but also certain techniques to help the mother during labour.

Closely associated with the education of the mother about her own needs and care is that about the needs of the new-born child. First, the mother must learn how to care for the new-born baby (how to feed it and wash it, for example); and second, the mother, the father, and any other relatives living within the household must be prepared psychologically for the arrival of the infant. The Russians feel that this is so important that they have the district paediatrician and the district health nurse visit each home on separate occasions during the last month of pregnancy to investigate the social and economic environment.²⁷

²⁴*Ibid.*

²⁵*Ibid.*, p. 59, and Crosse, *The Premature Baby*, T. & A. Churchill, London, 1966.

²⁶M. E. Davis and R. Rubin, *ibid.*, p. 112.

²⁷World Health Organization, *Maternal and Child Health in the U.S.S.R.*, *op. cit.*

Related to this last function is the role of obstetrical personnel in being a friend and confidant to the mother and the whole family. In fact, the roles of friend and educator are mutually supporting. As a friend, they can have great influence during this period when the patient and family are most receptive to friendly advice; being an educator raises their stock as a friend as well. Birth trauma may result in mental deficiency, and mental illness may be caused by the stresses and strains of childbirth or the failure to develop a satisfactory relationship between mother and child in the early days of infancy.²⁸ "It is coming to be understood that the quality of childbearing experience and the satisfaction derived from it may affect the development of the maternal feeling and the all important postpartum physiological and emotional interaction between mother and child."²⁹ Although much can be done of a preventive nature to eliminate unhappiness, it is nonetheless obvious from the above statements that the dual role of educator and friend is most important.

The role of educator is not exclusively the domain of any single particular type of obstetrical personnel in Ontario today. The physician usually is too busy to chat with the patient, and the patient sometimes shows a reluctance to talk freely with the physician about her problems. This is partly because he is generally a male, and partly because she feels foolish when she reveals her naïveté to a person of his assumed stature. The role thus falls to other types of personnel, such as the nurse, the public health nurse and the physiotherapist. There is a vital gap here that could be filled by a midwife, who could communicate the necessary information in the patient's home on an informal level.

An entire study could be devoted to an investigation of the various types of organizational structure that could be set up to perform this educating role. We will assume, however, that this is not a role for the physician; hence any use of a midwife in this area, although it may be important, will not significantly reduce the physician's work load. Thus, we come to the conclusion that if a midwife is instituted into Ontario's obstetrical team, she could save two-thirds of a doctor's time per *normal* pregnancy.

In addition to their roles during the period of pregnancy, obstetrical personnel must be able to provide assistance to the mother during labour and delivery, even if this stage is normal. Once again the chief function of personnel is to stand by and to watch for complications. They also must do everything in their power to make the patient comfortable and confident. They must know thoroughly the physiology of labour, which measures are helpful, and the time at which they should be carried out. They must be able, then, to diagnose the three stages of labour; know when and how to perform a prophylactic episiotomy; know how to

²⁸A. Woods, "The Role of the Midwife in Public Health", *Aspects of Public Health Nursing*, Public Health Paper Number 4, World Health Organization, Geneva, 1961, p. 128.

²⁹A. Mills, "The Role of the Nurse-Midwife in Great Britain", *Canadian Nurse*, Montreal, November 1959, p. 995.

aid in the actual birth of the infant and placenta; know how and when to administer anaesthesia; and know the proper steps to provide an antiseptic environment. Above all, they must be able to detect complications.

In trying to define the role of midwives we must once again have some concept of what is normal and some idea of the actual amount of time an obstetrician spends with a patient during a normal labour and delivery. The Society of Obstetricians and Gynaecologists of Canada states that "... every pregnancy, when it terminates either by delivery or abortion, is an emergency. A normal 'case' may become abnormal—even to the point of catastrophe—and in a matter of minutes may demand specialist's care."³⁰ Granting the truth of this statement, we must ask whether it effectively rules out the usefulness of a midwife as a substitute for a physician during labour and delivery.

In Great Britain, where many of the normal deliveries occur in the patient's home, there are "flying squads", teams of specialists that are on call for emergencies.³¹ In Ontario, where virtually all births take place in hospitals,³² it would seem not unreasonable to have a resident specialist on hand in case of emergency. Given the fact that most births are in hospitals and that there are a large number of normal deliveries, the services of midwives in combination with those of a resident obstetrician apparently could provide the same level of care that is now given by the mixture of general practitioners, obstetricians, internes and nurses without very much training in obstetrics.

The question that remains to be answered is how much of a physician's time per normal labour and delivery would be saved on average by use of a midwife. The Society of Obstetricians and Gynaecologists of Toronto states that present prepaid medical schemes regard anywhere up to thirty hours in labour as within normal limits.³³ However, the average is below this time limit. One estimate quoted in Zubriskie and Eastman states that the average primigravida (first pregnancy) takes about eighteen hours (first stage, sixteen hours; second stage, one and a half hours; and third stage, fifteen to thirty minutes). The average multipara takes twelve hours (first stage, eleven hours; second stage, half an hour; and third stage, fifteen to thirty minutes).³⁴

A. Woods and F. Brockington³⁵ maintain that it is extremely important that a woman in labour never be left alone, and that it is preferable that she be with someone she knows and trusts. A physician should not be expected to be present during this entire labour period but perhaps a midwife could, or at least could be

³⁰The Society of Obstetricians and Gynaecologists of Canada, *op. cit.*, p. 5.

³¹F. Brockington, *op. cit.*, p. 157.

³²*Canada Yearbook 1966*, Queen's Printer, Ottawa, 1966.

³³The Society of Obstetricians and Gynaecologists of Toronto, *op. cit.*, p. 4.

³⁴L. Zubriskie and N. J. Eastman, *op. cit.*, pp. 308, 313, 364.

³⁵A. Woods, *op. cit.*; F. Brockington, *op. cit.*

caring for several mothers at one time. Since she also could perform many of the required nursing functions, the presence of a midwife throughout the labour period might not add any additional cost to the birth procedure.

However, we are not concerned primarily with this function of the midwife in itself, but rather as her activity results in a saving of the physician's time. Generally a physician does not take an active part until the beginning of the second stage of labour, although he will make a few examinations, including a vaginal, during the first stage. We might then assume that the physician spends the entire second and third stage of labour with his patient. From the time estimates we have, it seems that normally this would involve anywhere from one to two hours (one hour for a multipara patient and two hours for a primigravida patient).

We should perhaps allow some time also for his examination during the first stage; we assume that this takes fifteen minutes. It may be argued that he loses much more time than this in travelling time, but this argument could be countered by two points. First, it is generally a resident physician and not the family physician who performs this function; and second, even if the family doctor does do the examination, he generally has other patients or responsibilities in the hospital that he could attend to while he is there. If travelling time is excessive, then clearly resources are not optimally organized.

The determination of an optimal structure of services for abnormal pregnancies is beyond the scope of this paper. It seems clear from the foregoing discussion, however, that a midwife could render many services during an abnormal pregnancy that would free the physician for other work. Our decision to exclude consideration of abnormal pregnancies is justified in part by the data presented later in this chapter on the percentage of "normal" pregnancies among all pregnancies.

Potential Requirements for Obstetrical Care

Predicting the number of women who will be pregnant each year in the future is a complicated task. The accuracy of even the most detailed method of prediction is always open to question, and accuracy decreases as the projection goes further into the future. Nevertheless, even a rough approximation will be useful to us in trying to estimate how many obstetrical personnel would be required to provide a given level of obstetrical care to all pregnant mothers.

Our method is a simple one. The Economic Council of Canada has produced a projection of the population by single age groups for each year from 1966-1967. Included is a projection of the number of children under one year of age in Ontario. These estimates include, of course, assumptions about fertility.

These numbers would be an accurate indication of the expected number of live-births but for two factors — namely, net migration and infant mortality. The Economic Council of Canada predicted that net immigration per year would

average 70,000.³⁶ We think it is fairly safe to assume that, if we were to work out the number of these who are under one year of age and who have come to Ontario, the resulting adjustment would not be very large. Therefore, we shall ignore this influence.

To allow for infant mortality, we use a mean average of the percentage rate of change in the infant death rate as a method of extrapolating existing data. Then, knowing the death rate and the absolute number of predicted live children, we obtain a rough estimate of the absolute number of infant deaths. Adding the absolute number of infant deaths to the absolute number of babies alive, we obtain an approximate figure for the number of women who will deliver a baby including one stillborn (a stillbirth is the birth after twenty-eight weeks of gestation of a baby which has not breathed).³⁷ Ideally, we also should make some allowance for multiple births.

We have still to estimate the number of women who will abort each year. The number of abortions is estimated from data on the percentage of abortions of all deliveries in Canada in 1964. We estimated this to be approximately 12 per cent. This means that the total number of pregnancies is 112 per cent of deliveries.³⁸ The estimation of the total number of expected abortions is particularly difficult to make on the basis of past trends. One reason is that not all abortions are reported. Another is that a trend determined by the percentage change is unpredictable because of the growing use of contraceptives, which are in effect a substitute for abortions, especially illegal ones.

Our final estimates of the total number of pregnant women are presented in Table 8.8.

Our next problem is the determination of the percentage of these pregnancies that can be considered normal. If we assume that all pregnancies either abort or deliver a live or stillborn foetus, then in 1964, there were 331,376 pregnancies. This figure was obtained by adding together the number of ectopic pregnancies, the number of abortions, the number of uncomplicated deliveries and the number of complicated deliveries.³⁹ We have no idea how much of the estimate is the result simply of double counting, for there is no doubt that some of the pregnancies could have more than one complication. Of this total number, 8,674 or 22.8 per cent had complicated pregnancies. In other words, 77.2 per cent were normal. This may be underestimating the number of normal pregnancies, if we are to define "normal" pregnancy as being within the competence of a midwife.

Of the total number of deliveries for 1964 — namely, 295,066 (we have excluded ectopic pregnancies and abortions which already have been allowed for

³⁶Economic Council of Canada, *Fourth Annual Review*, Queen's Printer, Ottawa, 1967, p. 56.

³⁷DBS, *Causes of Stillbirths, 1943-1955*, Catalogue #84-508, Queen's Printer, Ottawa, 1957.

³⁸DBS, *Hospital Morbidity, 1964*, Catalogue #82-526, Queen's Printer, Ottawa, 1967.

³⁹*Ibid.*

TABLE 8.8
Estimated Total Number of Pregnancies, Ontario, 1966-1979

	A ¹	B ²	B ^{1, 3}	C ⁴	C ^{1 5}	D ⁶	D ₁ ⁶	P ⁷	P ₁ ⁷
1966	140.702	23.1	19.7	3.250	2.772	143.952	143.474	161.226	160.691
1967	141.939	22.3	18.9	3.165	2.683	145.104	144.622	162.516	161.977
1968	143.334	21.5	18.1	3.082	2.594	146.416	145.928	163.986	163.439
1969	144.844	20.8	17.4	3.013	2.520	147.857	147.364	165.600	165.048
1970	146.447	20.1	16.7	2.944	2.446	149.391	148.893	167.318	166.760
1971	147.768	19.4	16.0	2.867	2.364	150.635	150.132	168.711	168.148
1972	150.648	18.7	15.4	2.817	2.320	153.465	152.968	171.881	171.324
1973	153.562	18.1	14.8	2.779	2.273	156.341	155.835	175.102	174.535
1974	156.324	17.5	14.2	2.736	2.220	159.060	158.544	178.147	177.569
1975	158.818	16.9	13.6	2.684	2.160	161.502	160.978	180.882	180.295
1976	160.733	16.3	13.1	2.620	2.106	163.353	162.839	182.955	182.440
1977	163.193	15.8	12.6	2.578	2.056	165.771	165.249	185.664	185.079
1978	165.395	15.3	12.1	2.531	2.001	167.929	167.926	188.080	188.077
1979	167.343	14.8	11.6	2.477	1.941	169.820	169.284	190.198	189.598

¹Represents the Economic Council of Canada study on population projections for the age group "O" only in Ontario.

²Represents the estimated infant mortality rate for Canada per 1,000 live-births.

³Represents the estimated infant mortality for Ontario per 1,000 live-births.

⁴Represents the absolute number of infant deaths in Ontario, based on the estimated infant mortality rates for Canada.

⁵Represents the absolute number of infant deaths in Ontario, based on the estimated infant death rate for Ontario.

⁶Represents the total number of births (deliveries) in Ontario, given the estimated infant death rate for Canada and Ontario respectively.

⁷Represents the absolute number of pregnant women including abortions for Ontario, given the infant death rate for Canada and Ontario respectively.

in complicated pregnancies) — only 27,020 or 9.2 per cent were classified as complicated. This figure is no doubt biased upward, since (as we have noted) one delivery could have more than one complication. On the assumption that this is a maximum estimate of the number of complicated deliveries, we are left with 90.8 per cent of all deliveries which are without complication. (As a percentage of total pregnancies, we find that complicated deliveries account for 8.1 per cent.)

Finally, of the 295,066 deliveries, there were only 6,080 (or 2.1 per cent) complicated puerperiums. If we consider the number of complicated puerperiums as a percentage of total pregnancies, we find it is only 1.8 per cent.

In summary then, we can say that 77.2 per cent of all pregnancies are normal; 91.9 per cent of all deliveries and 97.9 per cent of all postpartum periods are normal. We assume that these percentages will be relevant for the near future.

With these percentages we can now estimate the total number of expected normal pregnancies and deliveries. We do not need to know the number of normal puerperiums, because physicians do not now look after normal women during this period, except for one postpartum examination. As stated earlier, we are assuming that this examination remains within the province of the physician, even if we institute midwives into our system. Our estimates of the absolute number of normal pregnancies and deliveries are presented in Table 8.9.

TABLE 8.9
Estimated Number of Normal Pregnancies and Deliveries

Year	Estimated Number of Total Conceptions ¹	Estimated Number of Normal Pregnancies (77.2% of total)	Estimated Number of Normal Deliveries (91.9% of total)
1969	165,048	127,417	151,680
1970	166,760	128,739	153,252
1971	168,148	129,810	154,428
1972	171,324	132,262	157,447
1973	174,535	134,741	160,398
1974	177,569	137,083	163,186
1975	180,295	139,188	165,691
1976	182,440	140,844	167,662
1977	184,079	142,881	170,088
1978	188,077	145,195	172,843
1979	189,598	146,370	174,241

¹From column P₁ in Table 8.8.

Personnel Requirements

With our estimates of the total number of normal pregnancies, we can proceed to consider the cost of providing the required services. Recall that we have assumed that all pregnant mothers are to receive at least the given level of obstetrical care. The two alternative patterns of care that we had proposed earlier are obstetricians (or general practitioners), and midwives and obstetricians as a team.

From our earlier discussion, we estimated that a physician spends on the average three hours per woman during pregnancy, and that two of these hours could be delegated to midwives. During labour, a physician spends on the average one to two hours—let us assume one and a half hours—and here a midwife could relieve him of this duty completely. Finally, the duties of a physician during the puerperium could not, we assumed, be delegated to a midwife. Thus, out of a total of four and one half hours per normal pregnancy and delivery that a physician now does, or should, spend on each pregnancy, three and one half hours could be made the responsibility of a midwife.

From these time estimates and from the estimated number of normal pregnancies and deliveries shown in Table 8.9, we can determine the total number of hours per year required of each type of personnel for each of the two alternatives we are considering. These are presented in Tables 8.10 and 8.11.

If we assume that the average personnel work forty hours per week for forty-eight weeks a year, we find that each type of personnel can provide 1,920 hours

TABLE 8.10
Total Hours Required for Normal Obstetrical Cases: Obstetrician Only

Year	Total No. of Normal Pregnancies	Hours Per Pregnancy	Total No. of Hours Required	Total No. of Normal Deliveries	Hours Per Delivery	Total Hours	Total Hours Required For Prenatal Care and Delivery
1969	127,417	3	392,251	151,680	1.5	227,520	600,771
1970	128,739	3	386,217	153,252	1.5	229,878	616,095
1971	129,810	3	389,430	154,528	1.5	331,792	621,222
1972	132,262	3	396,786	157,447	1.5	236,171	632,957
1973	134,741	3	404,223	160,223	1.5	240,597	644,820
1974	137,083	3	411,249	163,186	1.5	244,779	656,028
1975	139,188	3	417,564	165,691	1.5	248,537	666,101
1976	140,844	3	422,532	167,662	1.5	251,493	674,025
1977	142,881	3	428,643	170,088	1.5	255,132	683,775
1978	145,195	3	435,585	172,843	1.5	259,262	694,847
1979	146,370	3	439,110	174,241	1.5	261,362	700,472

TABLE 8.11
Total Hours Required for Normal Obstetrical Cases: Midwives and Obstetricians

Midwives						Obstetricians			
Year	Total No. of Pregnancies	No. of Hours per Pregnancy	Total Hours for Pregnancies	Total No. of Deliveries	Hours per Delivery	Total Hours for Deliveries	Total Hours for Pregnancies and Deliveries	No. of Hours per Pregnancy	Total Hours for Pregnancies
1969	127,417	2	254,834	151,680	1.5	227,520	482,354	1.0	127,417
1970	128,739	2	257,478	153,252	1.5	229,878	487,356	1.0	128,739
1971	129,810	2	259,620	154,528	1.5	231,792	491,412	1.0	129,810
1972	132,262	2	264,524	157,447	1.5	236,171	500,695	1.0	132,262
1973	134,741	2	269,482	160,398	1.5	240,597	510,079	1.0	134,741
1974	137,083	2	274,166	163,186	1.5	244,779	518,945	1.0	137,083
1975	139,188	2	278,376	165,691	1.5	248,537	526,913	1.0	139,188
1976	140,844	2	281,688	167,662	1.5	251,493	533,181	1.0	140,844
1977	142,881	2	285,762	170,088	1.5	255,132	540,894	1.0	142,881
1978	145,195	2	290,390	172,843	1.5	259,262	549,652	1.0	145,195
1979	146,370	2	292,740	174,241	1.5	261,362	554,102	1.0	146,370

per year. This choice of hours is strictly arbitrary and made in full realization that many physicians work much more than this.⁴⁰ However, once one considers lunch hours, coffee breaks and "patient flow" problems, we believe that forty hours of actual service time is a reasonable estimate. On the basis of this and, in turn, on the basis of the estimated number of required hours shown in Tables 8.10 and 8.11, we can estimate the number of personnel needed with respect to each alternative; these estimates are presented in Table 8.12.

Annual Cost of the Proposed Program

The total annual cost of maintaining the required number of personnel can be found by multiplying the required number by their expected salary (net income before taxes). According to the 1966 edition of *Taxation Statistics*, about 5,740 physicians and surgeons had \$135,097 in taxable returns or a mean average of \$23,500 in the 1964 taxation year; this was before personal deductions.⁴¹

The results of a questionnaire sent out to the physicians across Canada show that the average general practitioner in private practice in Ontario for 1960 earned \$14,930, compared to \$13,820 for Canada as a whole (mean average). The specialist in private practice in Ontario earned \$20,660 on the average in 1960, compared to a mean average of \$18,730 for Canada as a whole. Obstetricians and gynaecologists in private practice averaged \$24,020 in Ontario in 1960, compared to a mean average of \$20,770 for Canada as a whole.⁴²

It is somewhat more difficult to estimate the salary required to maintain a midwife. If we assume that a midwife must be a registered nurse first and then do one year of postgraduate training after that, we would expect her to earn more than a registered nurse. Let us assume that a midwife would have to be paid \$8,000 to compensate her for her services.

This yields a ratio of the cost of maintaining a nurse compared to a physician or surgeon of \$8,000/\$23,500 or 34 per cent (Department of National Revenue data). If we take the lowest mean income for obstetricians, according to Judek's figures, we obtain a ratio of the cost of a midwife to that of an obstetrician of \$8,000/\$20,770 or 39 per cent. If we compare the cost of maintaining a midwife compared to the cost of maintaining a general practitioner (again using Judek's lowest figures), we obtain the ratio \$8,000/\$12,830 or 58 per cent.

The result of our calculations, using \$23,500 as the annual salary of an obstetrician, are presented in Table 8.13. Although crude, these estimates give an

⁴⁰K. F. Clute, *op. cit.*, pp. 103, 192.

⁴¹Department of National Revenue, Taxation Division, *Taxation Statistics, Part 1, 1966 Edition, op. cit.*, p. 70.

⁴²S. Judek, *op. cit.*, pp. 221, 377-378.

TABLE 8.12
Total Number of Personnel Required Each Year, Plus the Additional Increase Required per Year for Each of the Two Proposed Alternatives

Year	Midwives and Obstetricians					Obstetricians Only				
	Total Required Midwife	Hours per year	Total Number of Required Personnel Midwife	Obstetrician	Required Yearly Increase Midwife	Obstetrician	Total Required Hours	Hours per year	Total No. Obstetrician Required	Required Yearly Increase
1969	482,354	127,417	1,920	251	66	—	609,771	1,920	318	—
1970	487,356	128,739	1,920	254	67	3	616,095	1,920	321	3
1971	491,412	129,810	1,920	256	68	2	621,222	1,920	324	3
1972	500,695	132,262	1,920	261	69	5	632,957	1,920	330	6
1973	510,079	134,741	1,920	266	70	5	644,820	1,920	336	6
1974	518,945	137,083	1,920	270	71	4	656,028	1,920	342	6
1975	526,913	139,188	1,920	274	72	4	666,101	1,920	347	5
1976	533,181	140,844	1,920	278	73	4	674,025	1,920	351	4
1977	540,894	142,881	1,920	282	74	4	683,775	1,920	356	5
1978	549,652	145,195	1,920	286	76	4	694,847	1,920	362	6
1979	554,102	146,370	1,920	289	76	3	700,472	1,920	365	3

TABLE 8.13
Total Cost of Salary to be Borne by Society for Both Alternatives

Year	Midwives and Obstetricians				Obstetricians Only					
	Required No. of Midwives	Salary	Total Cost of Midwives	Required No. of Obstetricians	Salary	Total Cost of Obstetricians	Aggregate Cost for this Alternative	Required No. of Obstetricians	Salary	Total Cost for this Alternative
1969	251	8,000	2,008,000	66	23,500	1,551,000	3,559,000	318	23,500	7,473,000
1970	254	8,000	2,032,000	67	23,500	1,574,500	3,606,500	321	23,500	7,543,500
1971	256	8,000	2,048,000	68	23,500	1,598,000	3,646,000	324	23,500	7,614,000
1972	261	8,000	2,088,000	69	23,500	1,621,500	3,709,500	330	23,500	7,755,000
1973	266	8,000	2,128,000	70	23,500	1,645,000	3,773,000	336	23,500	7,896,000
1974	270	8,000	2,160,000	71	23,500	1,668,500	3,828,500	342	23,500	8,037,000
1975	274	8,000	2,192,000	72	23,500	1,692,000	3,884,000	347	23,500	8,154,500
1976	278	8,000	2,224,000	73	23,500	1,715,500	3,939,500	351	23,500	8,248,500
1977	282	8,000	2,256,000	74	23,500	1,739,000	3,995,000	356	23,500	8,366,000
1978	286	8,000	2,288,000	76	23,500	1,786,000	4,074,000	362	23,500	8,507,000
1979	289	8,000	2,312,000	76	23,500	1,786,000	4,098,000	365	23,500	8,577,500

idea of the tremendous savings that would accrue if there were introduced a reasonable division of labour between obstetrician and midwife.

Cost of Educating the Required Personnel

The other aspect of cost, the cost of education, is somewhat more difficult to ascertain. This includes both the cost borne by society and that borne by the student. Before these costs can be determined, we must have some idea of the number of students necessary to yield the required number of practising personnel. Assuming we have the correct number of practising personnel, the required number of graduates in any given year would depend on the required increase in the number of personnel as the population grew, the level of attrition including net migration and the expected number of graduates who would be willing to practise in Ontario. Once we know the required number of graduates, we can estimate the enrolment of the average sized medical school. This would be a function of the number of years of course work required and the failure rate. Once we know the average size of the yearly enrolment in the medical school, we can estimate the operating and capital costs of educating the personnel.

If we make the same assumptions as we did in the previous chapter, we come to the same conclusion: the relative cost of training the two types of personnel will be directly related to the relative length of their respective educational programs. Assuming that the length of such a program for the midwife would be three to four years and that for the obstetrician is eight to ten years, the ratio of education costs would be in the order of 3.5 to 9. This in turn represents a considerable saving of society's scarce resources.

Conclusion

Now if a midwife can truly relieve a physician of 77.8 per cent of his responsibilities in terms of hours of work, then for the part of obstetrical care that we have considered and as far as the costs of maintaining and educating the personnel are concerned, the midwife is the superior resource. This will be the case as long as her income falls below that of the physician. This conclusion implies, of course, that, within the narrow range of services that we have suggested could be done by a midwife, the quality of work performed by the midwife is as high as that performed by the physician.

Before we could suggest that the midwife be introduced into the health sector, the following additional information would have to be obtained:

- 1) What is the productivity of the midwife exactly?
- 2) What are the relative attrition rates, failure rates and migration rates for midwife and obstetrician?
- 3) What precisely is the cost of one year of education for the midwife compared to that for the obstetrician?

Our study leads us to believe that there is ample justification, if not for the training and use of midwives in Ontario, at least for broad experimentation in their use in hospitals, group practices and public health centres. This is so even if the duties of the midwife involve little more than substituting for the physician in those areas of obstetrical care that we have especially noted.

In countries where midwives practise freely, this is not their sole function. As well as her medical responsibilities, the midwife has duties within the realm of nursing, education, physiotherapy, psychology, sociology (as friend and confidant), and public health nursing. Many of these roles presently are not filled adequately in Ontario in either quantity or quality.

There is also the question as to whether or not the people of Ontario will accept the midwife as a substitute for the physician. Studies on the relative ease with which such personnel have been accepted in some North American communities are reported in Chapters 9 and 10. In any case, the public should be given the opportunity to reveal its preferences.

The midwife could be thought of as a type of personnel who is at the same or almost the same level of competence as a general practitioner, but who specializes in a much narrower field. For this reason it might be a good idea to call members of this profession something other than midwives, for the name seems to have an unfavourable connotation to the general public.

The established fact that the overall level of Ontario's obstetrical health is surprisingly low compared to other countries seems to indicate that there is something wrong with the present pattern of providing obstetrical care. We suggest that an individual with three to four years (following high school) of training and education in obstetrical care would do a great deal to improve infant and maternal health.

Finally, it may be surmised that the high levels of infant mortality in Ontario and Canada stem directly from the fact that only a small proportion of pregnant mothers receive obstetrical care from an obstetrician; indeed, that a large portion of pregnant mothers, even though they deliver their babies in a hospital, receive almost nothing in the way of the kind of obstetrical care that we have outlined as being reasonable. Accordingly, if a government actually takes seriously its responsibility under a universal medical care plan to provide this given level of obstetrical care to all mothers, it must surely be in the position of not being able to train the requisite number of obstetricians. More positively, it must be in the position of having to train midwives and to combine them in an obstetrical care team with an obstetrician.

Chapter 9 Rural Family Health Care: Public Health Nurse versus Physician

The unequal geographic distribution of health care personnel noted in Chapter 3 leads one to ask whether the economic structure of the health sector might be made more efficient by introducing a new type of human health care resource — namely, the public health nursing practitioner. Such a person would require an education program that was only half of that taken by the physician. The job functions undertaken by the public health nursing practitioner would resemble those of the feldscher described in Chapter 4.

Before we compare the advantages of the physician and the public health nurse in the provision of rural family health, we review briefly the existing distributional pattern of health care resources and their utilization by rural persons. We also examine the quality of health care provided in rural areas. Finally, we consider the health care needs of the rural population.

Urban-Rural Distribution of Physicians

As rational maximizers of satisfaction, physicians can be expected to establish their practices in areas that offer them the greatest advantage. In Canada, the resulting distribution of physicians shows a marked urban orientation (see Table 9.1; in particular, the figures on the physician:population ratios for metropolitan and provincial areas). We note that the physician:population ratio for Ontario as a whole is 1:776, that for the non-metropolitan population is 1:1,201, and that for Toronto is 1:578.

In fact, in every province, the percentage of physicians in the metropolitan areas is much greater than that in the entire provincial population. Further, the greater the degree of “rurality” of a province (that is, the larger the percentage of the population outside metropolitan areas), the greater the imbalance between physician:population ratios for metropolitan and non-metropolitan areas. It is not surprising to note, therefore, that those provinces generally considered to be poorer (which is almost synonymous with being more rural), have correspondingly lower physician:population ratios (see especially the Maritimes).

If we consider specialists, the disparity is, as expected, even more pronounced. Not only do specialists tend to congregate in urban centres, but they tend to

TABLE 9.1
Active Civilian Physicians Located in Metropolitan Areas, Provinces and Canada, 1961

Province and City	Population			Metropolitan Areas ¹			Physician: Population Ratio	Provincial Physician: Population Ratio	Provincial Non-Metro- politan Physician: Population Ratio
	Number	Per Cent of Province	Physicians	Number	Per Cent of Province	Physicians			
Newfoundland									
St. John's	90,838	19.8		179	51.7	1:763	1:1,991	1:3,306	
Nova Scotia									
Halifax	183,946	25.0		338	47.9	1:544	1:1,044	1:1,503	
New Brunswick									
Saint John	95,563	16.0		135	29.7	1:708	1:1,314	1:1,570	
Quebec									
Montreal	2,109,509	40.1		3,728	60.5	1:568	1:853	1:1,696	
Quebec City	357,568	6.8		683	11.1	1:524			
Sherbrooke	70,253	1.3		105	1.7	1:669			
Trois Rivières	86,659	1.6		97	1.6	1:893			
TOTAL	2,623,989	49.8		4,613	74.9	1:569	1:776	1:1,201	
Ontario									
Hamilton	395,189	6.3		520	6.5	1:760			
Kingston	63,419	1.0		220	2.7	1:288			
Kitchener-Waterloo	154,864	2.5		185	2.3	1:837			
London	181,283	2.9		433	5.4	1:419			
Ottawa City and Eastview	292,761	4.7		577	7.2	1:507			
Oshawa	80,918	1.3		91	1.1	1:889			
Sudbury	110,694	1.8		129	1.6	1:858			

TABLE 9.1 (Continued)
Active Civilian Physicians Located in Metropolitan Areas, Provinces and Canada, 1961

Province and City	Metropolitan Areas ¹			Physician: Population Ratio	Provincial Physician: Population Ratio	Provincial Non-Metro- politan Physician: Population Ratio
	Population Number	Per Cent of Province	Physicians Number	Per Cent of Province		
Toronto	1,824,481	29.3	3,157	39.3	1:578	
Windsor	193,365	3.1	280	3.5	1:691	
TOTAL	3,296,974	52.9	5,592	69.6	1:590	
Manitoba						1:1,913
Winnipeg	475,989	51.6	887	79.2	1:537	1:823
Saskatchewan						1:1,650
Regina	112,141	12.1	235	24.7	1:477	1:973
Saskatoon	95,526	10.3	281	29.5	1:340	
TOTAL	207,667	22.4	516	54.2	1:402	
Alberta						1:1,593
Calgary	279,062	21.0	331	24.4	1:843	1:982
Edmonton	337,568	25.3	576	42.5	1:586	
TOTAL	616,630	46.3	907	66.9	1:680	
British Columbia						1:1,229
Vancouver	790,165	48.5	1,352	62.9	1:584	1:758
Victoria	154,152	9.5	231	10.7	1:667	
TOTAL	944,317	58.0	1,583	73.6	1:597	
Canada	8,535,913		14,690		1:581	1:1,474

¹Metropolitan areas except Regina, Saskatoon and Ottawa, which excludes Hull and other cities within the Province of Quebec, include suburban parts and cities.

SOURCE: DBS, *Census of Canada, 1961*, Census (Demography) Division, Occupation and Employment Section, from S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 134.

establish themselves in the urban areas of highly urban provinces. This is all the more significant when one considers that over one-third of Canada's physicians are certified specialists; indeed, certified and non-certified specialists taken together accounted for 51.1 per cent of the total number of medical doctors in 1961.¹

Data in Tables 9.2 and 9.3 show physician:population ratios for general practitioners and certified specialists by province and for Canada. The general practi-

TABLE 9.2
Ratios of General Practitioners and Certified Specialists to Population, Provinces and Canada, 1961

Province	No.	G.P.: Pop. Ratio	Per 100,000 Pop.	No.	Total Phys. in Prov. %	Total Specialists %	Cert. Specialist: Pop. Ratio
Nfld.	186	1:2,462	40.62	29	27.8	0.8	1:7,154
P.E.I.	53	1:1,974	50.66	64	31.9	0.4	1:3,608
N.S.	402	1:1,833	54.54	236	33.4	3.0	1:3,123
N.B.	231	1:2,588	38.63	199	43.7	2.5	1:3,005
P.Q.	2,506	1:2,099	39.09	2,443	39.6	30.8	1:2,153
Ont.	4,135	1:1,508	66.31	2,912	36.2	36.7	1:2,142
Man.	523	1:1,762	56.74	293	31.9	4.5	1:2,582
Sask.	471	1:1,964	50.91	357	30.8	3.7	1:3,158
Alta.	816	1:1,632	61.26	529	39.0	6.7	1:2,518
B.C.	793	1:2,054	48.68	863	40.1	10.9	1:1,888
Yukon and N.W.T.	17	1:2,213	45.18	n.a.	n.a.	n.a.	n.a.
Canada	10,133	1:1,800	55.67	7,925	37.3	100.0	1:2,297

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965.

TABLE 9.3
Ratios of Specialists¹ for Regions and Canada, 1961
(per 100,000 population)

Specialty	WHO Recom. Ratio	Atlantic Pro- vinces	Quebec	Ontario	Prairie Pro- vinces	British Colum- bia	Canada
General surgery	10.00	10.17	10.04	12.28	10.26	12.83	11.10
Ophthalmology and otolaryngology	6.60	3.48	3.94	4.30	3.84	5.46	4.13
Obstetrics and gynaecology	5.00	2.90	2.90	6.29	5.44	6.20	5.62

¹Certified and non-certified specialists.

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965.

¹S. Judek, *op. cit.*, p. 156.

tioner:population ratio is seen to vary directly with the relative rurality of the provinces. Although in every region the ratio of general surgeons to population is higher than that suggested by the World Health Organization, it is probable that rural areas all but completely lack such personnel.

In Table 9.4, we have ranked the five regions of Canada by the urban:total population ratio, the general practitioner:population ratio, the certified specialist:population ratio, and the total specialist:population ratio (for eleven specialties).

TABLE 9.4

Ranking of Urban:Total Population Ratio,¹ General Practitioner:Population Ratio,² Certified Specialist:Population Ratio,³ and Total Specialist:Population Ratio,³ Five Regions of Canada, 1961

Region	Urban:Total Population Ratio	G.P.:Pop. Ratio	Cert. Spec.:Pop. Ratio	Certified and Non-Certified Specialist: Population Ratio
Atlantic Provinces	5	5	5	5
Quebec	3	4	3	3
Ontario	1	1	2	2
Prairie Provinces	4	2	4	4
British Columbia	2	3	1	1

¹From DBS, *Census of Canada, 1961*, Advance Report No. AP-4, Catalogue No. 92-518. Determined by taking rural population over total population figures.

²From Tables 9.2, 9.3.

³From S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 337. Determined by adding ratios for 11 specialties.

Finally, we might look at the data in Table 9.5, which describe both the geographic and the demographic distribution of physicians by county in Ontario. Not only must one physician serve a large population in rural areas, but he must spend a great deal more time travelling to visit patients (and of course, patients must spend a great deal more time travelling to see him).

Utilization of Personnel in Rural Areas

Given that health care resources are highly concentrated in urban areas, it follows directly that rural inhabitants will not consume as much health care as the urban dweller. Even if family income, level of education, social class, and general motivation were the same in both areas, the relative absence of health care resources in rural areas imposes an added transportation cost which could be expected to curtail use. To the extent that income, educational attainments, and social class vary between rural and urban areas, we can expect an even greater differential in utilization rates.

TABLE 9.5
Active Civilian Physicians in Relation to Population and Area,
by County and Census Division, Ontario, 1961

County and Census Division	Population June, 1961	% of Urban Population	Physicians June, 1961	Physicians: Population Ratio	Sq. Mi. Per Physician
Div.					
1 (Algoma)	111,408	73.1	72	1:1,547	268.3
2 (Brant)	83,839	75.9	92	1:911	4.6
3 (Bruce)	43,036	34.9	29	1:1,484	56.9
4 (Carleton)	352,932	92.1	627	1:563	1.5
5 (Cochrane)	95,666	66.2	67	1:1,428	779.7
6 (Dufferin)	16,095	36.2	12	1:1,341	46.4
7 (Dundas)	17,162	32.8	12	1:1,430	32.0
8 (Durham)	39,916	46.6	25	1:1,597	25.2
9 (Elgin)	62,862	48.9	72	1:873	10.0
10 (Essex)	258,218	81.4	328	1:787	2.2
11 (Frontenac)	87,534	72.5	232	1:377	6.9
12 (Glengarry)	19,217	13.5	11	1:1,747	43.5
13 (Grenville)	22,864	40.5	16	1:1,429	28.9
14 (Grey)	62,005	48.4	52	1:1,192	32.8
15 (Haldimand)	28,197	33.5	17	1:1,659	28.7
16 (Haliburton)	8,928	—	4	1:2,232	371.5
17 (Halton)	106,967	88.8	125	1:856	2.9
18 (Hastings)	93,377	59.7	73	1:1,279	31.8
19 (Huron)	53,805	33.7	37	1:1,454	35.0
20 (Kenora)	51,474	48.1	35	1:1,471	4,377.7
21 (Kent)	89,427	56.8	83	1:1,077	11.1
22 (Lambton)	102,131	67.1	106	1:964	10.6
23 (Lanark)	40,313	57.1	40	1:1,008	28.5
24 (Leeds)	46,889	50.9	52	1:902	17.3
25 (Lennox and Addington)	23,717	19.0	13	1:1,824	90.0
26 (Lincoln)	126,674	74.9	167	1:759	2.0
27 (Manitoulin)	11,176	13.7	5	1:2,235	317.6
28 (Middlesex)	221,422	82.0	462	1:479	2.7
29 (Muskoka)	26,705	34.4	22	1:1,214	72.0
30 (Nipissing)	70,568	61.1	60	1:1,176	126.0
31 (Norfolk)	50,475	34.6	25	1:2,019	25.4
32 (Northumberland)	41,892	42.6	30	1:1,396	24.5
33 (Ontario)	135,895	79.3	128	1:1,062	6.7
34 (Oxford)	70,499	51.4	69	1:1,022	11.1
35 (Parry Sound)	29,632	31.5	20	1:1,482	216.8

(Continued on next page)

TABLE 9.5 (Continued)

County and Census Division	Population June, 1961	% of Urban Population	Physicians June, 1961	Physicians: Population Ratio	Sq. Mi. Per Physician
36 (Peel)	111,575	78.0	131	1:852	3.6
37 (Perth)	57,452	57.4	51	1:1,127	16.5
38 (Peterborough)	76,375	72.6	87	1:878	16.3
39 (Prescott)	27,226	46.9	19	1:1,433	26.0
40 (Prince Edward)	21,108	28.1	18	1:1,173	21.7
41 (Rainy River)	26,531	65.3	16	1:1,658	454.8
42 (Renfrew)	89,635	52.7	47	1:1,907	64.0
43 (Russell)	20,892	26.0	8	1:2,612	50.9
44 (Simcoe)	141,271	51.0	124	1:1,139	13.4
45 (Stormont)	57,867	75.4	48	1:1,206	8.6
46 (Sudbury)	165,862	71.4	146	1:1,136	123.7
47 (Thunder Bay)	138,518	80.1	125	1:1,108	419.8
48 (Temiskaming)	50,971	65.2	40	1:1,274	147.4
49 (Victoria)	29,750	47.0	28	1:1,063	48.1
50 (Waterloo)	176,754	83.7	198	1:893	2.6
51 (Welland)	164,741	81.1	148	1:1,113	2.6
52 (Wellington)	84,702	65.0	92	1:921	11.1
53 (Wentworth)	358,837	90.4	465	1:772	1.0
54 (York)	1,733,108	97.4	3,029	1:572	0.3
Total Ontario	6,236,092	77.3	8,040	1:776	41.5

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, pp. 323-324.

TABLE 9.6

Number of Physician Visits, Number of Visits per Person per Year, and Population, by Residence Characteristic, United States, July 1963-June 1964 and July 1958-June 1959

Residence Characteristic ¹	July 1963-June 1964 Number of visits in thousands	July 1958-June 1959 Number of visits in thousands	July 1963-June 1964 Number of visits per person per year	July 1958-June 1959 Number of visits per person per year	July 1963-June 1964 Population in thousands	July 1958-June 1959 Population in thousands
All persons	844,347	813,412	4.5	4.7	185,797	171,300
SMSA ²	568,332	517,780	4.8	5.0	118,731	102,815
Outside SMSA:						
Nonfarm	237,031	226,398	4.3	4.6	55,346	49,232
Farm	38,984	69,235	3.3	3.6	11,720	19,253

¹Estimates for July 1958-June 1959 are for urban, rural-nonfarm and rural-farm residents (see note 2).

²Standard metropolitan statistical areas. Two hundred and twelve such areas were defined for the 1960 Decennial Census. For further and more detailed definitions, see Source, Appendix 2 of the census.

SOURCE: U.S. Department of Health, Education and Welfare, *Physician Visits*, Series 10, No. 18, United States Government Printing Office, Washington, D.C., June 1965, p. 13.

Some of the limited information available on utilization by rural and non-rural persons is presented in Table 9.6 (U.S. data). We note that farm persons made fewer visits than non-farm rural persons, who in turn made fewer visits than urban dwellers.

In the same vein, there is a relationship between the degree of rurality and the time interval between visits to a physician (see Table 9.7).

TABLE 9.7
Time Interval Since Last Physician Visit, Percentage Distribution,
United States, July 1963-June 1964

Residence Characteristic	Under 6 months	6-11 months	Over 1 year	Never or Unknown
SMSA	51.7	15.9	30.4	2.0
Outside SMSA				
Non-Farm	49.0	15.8	32.0	3.2
Farm	41.7	15.2	37.2	5.9

SOURCE: U.S. Department of Health, Education and Welfare, *Physician Visits*, Series 10, No. 18, U.S. Government Printing Office, Washington, D.C., June 1965, p. 18.

Additional information on utilization is available for different income classes. Accordingly, we first establish the fact that rural areas may be associated with low income areas (see Table 9.8).

TABLE 9.8
Average Income of Individuals by Sex, Rural and Urban Residence,
for Canada and Ontario, Year Ending May 31, 1961

	Total	Males Rural	Urban	Total	Females Rural	Urban
Canada	3,999	2,927	4,263	1,651	1,145	1,742
Ontario	4,335	3,436	4,484	1,247	1,247	1,810

SOURCE: DBS, *Census of Canada, 1961: General Review, Earnings and Income Distribution*, Catalogue No. 99-524, pp. 14-30, Queen's Printer, Ottawa, 1967.

Having established that rural areas are usually characterized by relatively low incomes, we look at data describing the relationship between income and expenditures on health (see Table 9.9). The annual number of physicians' visits per person recorded in the same survey for the same four income classes in Table 9.9 were 4.6, 4.6, 5.1, and 5.7 respectively.²

²U.S. Department of Health, Education and Welfare, *Medical Care, Health Status, and Family Income*, Series 10, No. 9, U.S. Government Printing Office, Washington, D.C., May 1964, p. 44.

TABLE 9.9
Health Expenses per Person per Year, by Family Income and Type of Expense,
United States, July-December 1962

Type of Expense	All Incomes	Under \$2,000	Family Income		
			\$2,000 — \$3,999	\$4,000 — \$6,999	\$7,000+
All expenses	129	112	116	119	153
Hospital	30	28	30	30	31
Doctor	43	36	38	41	52
Medicine	26	28	26	23	28
Other	11	11	11	9	13

SOURCE: U.S. Department of Health, Education and Welfare, *Medical Care, Health Status, and Family Income*, Series 10, No. 9, U.S. Government Printing Office, Washington, D.C., May 1964, p. 44.

Finally, we note the data in Table 9.10 showing the distribution of persons by income groups and the number of persons in each income group reporting a demand for a particular type of health care. Although the high income group accounts for less than 10 per cent of the population sampled, it accounts for more than 10 per cent of physicians' home calls.

Although the information we have presented is sketchy, the relationship between rurality and low utilization of health care resources seems established.

Quality of Rural Health Care

We now consider briefly the quality of the health care that is provided in rural areas. How does the service provided by rural physicians compare with that of urban physicians? For the purposes of this study, we are concerned chiefly with the general practitioner. Although specialists represent the largest proportion of medical doctors, the low population density of rural areas does not make it feasible for specialists to practise there unless they become attached to a clinic type of organization.

The study by K. F. Clute on the general practitioner in Ontario and Nova Scotia has now been mentioned several times. For many physicians involved in his random sample, Clute found the quality of practice were deficient. We might note that of the forty-four Ontario physicians studied, eighteen were in communities with a population under 10,000; in Nova Scotia, the proportion was twenty-five out of forty-two physicians.

F. D. Mott and M. I. Roemer in their book, *Rural Health and Medical Care*,³ describe the average rural physician as having poor, cramped office facilities,

³F. D. Mott and M. I. Roemer, *Rural Health and Medical Care*, McGraw Hill, New York, 1948.

TABLE 9.10

Distribution of Persons for Selected Income Groups and Number of Persons Reporting Health Care during Survey Year 1950-1951, Canada

	Total	Low Income	Medium Income	High Income Lower	High Income Upper
Population by group	13,538	2,718	6,266	3,271	1,200
Physicians' services	4,421	795	2,114	1,074	418
Office calls	4,421	795	2,114	1,074	418
Home calls					
Office and/or	2,481	456	1,128	607	274
home calls	5,673	1,043	2,683	1,368	549
Clinic visits	630	113	309	147	58
Any calls or visits	5,851	1,086	2,768	1,407	559
Inpatient hospital care	1,383	271	699	298	107
Medical care	6,056	1,147	2,865	1,439	573
Home nursing services					
Graduate nursing care	107	24	53		-29-
Non-graduate					
nursing care	49	14	23		-11-
Any nursing care	145	37	71		-36-
Any health care	7,190	1,283	3,386	1,781	706
No health care	6,348	1,435	2,880	1,490	495

SOURCE: DBS, *Canadian Sickness Survey 1950-1951: Volume of Health Care for Selected Income Groups*, Catalogue No. 82-509, Queen's Printer, Ottawa, May 1955, p. 23.

TABLE 9.11

Employment of Nursing, Technical, Clerical and Other Staff by General Practitioners in Solo Practice, by Size of Community, Canada, 1960

Size of Community	Response Count	Mean No. Employed per Doctor ¹			Total
		Nursing	Tech.	Clerical and Other	
Rural	430	0.22	0.05	0.34	0.61
Urban less than 10,000 population	352	0.27	0.05	0.41	0.73
Urban 10,000-100,000 population	440	0.31	0.04	0.52	0.87
Urban over 100,000 population	684	0.36	0.05	0.39	0.80

¹Number of staff divided by response count.

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 383.

inadequate diagnostic equipment, and poorly trained (if any) auxiliary personnel. He is overworked, and he may belong to an ineffective local medical society. Clute also found these problems in a significant portion of his subjects. This, together with the fact that 30 per cent of the Ontario physicians were in cities of over 100,000 where they had ready access to facilities and had more "competitive" and intraprofessional pressure to maintain standards, caused him to assume that rural doctors were the most frequent "offenders" against the rules of good practice.

Dr. Clute found also that there was a relationship between the number of paramedical personnel employed and the location of the practice — that is, urban or rural (see Table 9.11).

Another factor is age. Clute was "struck by the relationship between quality of practice and age of the physician".⁴ Not only do individual physicians tend to do poorer work as they grow older, but there is also a relationship between age and the various factors said to be correlated with quality (mentioned above). Data in Table 9.12 show Clute's findings. (It is significant that physicians in rural areas are usually older than the average age of all physicians.)

TABLE 9.12
Distribution of Physicians by Age and Score,¹ Ontario

Age of Physician	Score 0 - 40	41 - 60	60 - 100	Total Physicians	Mean Score ² %
Up to 35	1	1	8	10	71.2
36 - 45	2	4	9	15	59.1
46 - 61	9	4	5	18	48.1
Total					
physicians	12	9	22	43	57.3
Mean Age	49.2	44.6	40.7	43.9	

¹The system of scoring used represents a rating out of 100 on the quality of the practice.

²The inverse correlation is significant (p. 0.01).

SOURCE: K. F. Clute, *The General Practitioner*, University of Toronto Press, Toronto, 1963, p. 319.

Other Health Care Resources in Rural Areas

Again taking provincial or national averages as the standard, it is clear that the shortage of medical personnel in rural areas is not confined to physicians. There "tends to be a smaller and less effective force of all types of medical and related personnel than in the cities" largely because of the "economic and geographic features of rural life".⁵

We have pointed out the lower proportion of paramedical personnel per physician. This problem extends to institutional nursing. Manitoba's Committee on

⁴K. F. Clute, *op. cit.*, p. 319.

⁵F. D. Mott and M. I. Roemer, *op. cit.*, p. 149.

the Supply of Nurses was concerned particularly with "the difficulties faced by rural hospitals in obtaining adequate nursing staff".⁶ Rural hospitals have to rely mainly on graduates who were raised in the area, and there has been a 23 per cent decline in the enrolment of such students in Manitoba nursing schools from 1961 to 1966.⁷ In general, rural and sparsely inhabited areas are "not well served by nursing". Although the supply of nurses is increasing slowly relative to the demand everywhere in Canada, "inquiries indicate that the shortage of nursing is most acute in rural areas".⁸

Hastings and Mosley feel that the part-time health services such as are provided in smaller communities are inadequate.

Ratios of full-time staff equivalents to population vary in the communities studied from approximately 1:1,300-2,000 in full-time departments, to 1:5,000 in part-time urban departments. In the part-time rural programs the population served is so small as to make it uneconomic to have separate staff, other than a part-time health officer. Yet, their needs are no different from comparable areas with a full-time program and staff.⁹

Visiting nursing and home-making services are provided by voluntary agencies, including the Victorian Order of Nurses in many urban communities, the Ontario Division of the Red Cross in a number of cities, and the St. Elizabeth Visiting Nurses Association in a few cities. Visiting nursing services are provided only under the direction of a physician, while home-making services are often very limited in scope. Home care services are rarely available in rural areas or small urban centres in Ontario, and a recent study in rural Wellington County indicated an extensive "unmet need" for such services.¹⁰ In 1960, the services of the Victorian Order of Nurses were available to 71 per cent of Ontario's population, but about one-third of the 344 nurses were employed by the Toronto branch, and all but two cities with over 100,000 population were served.¹¹

The lack of adequate hospital facilities in rural areas is well established. Staffing difficulties have been implied in the general discussion of personnel, but the availability of facilities is especially limited in rural areas. By this we mean not only the number of hospitals, but also the extent of services provided. Many such hospitals, even if of sufficient size, "usually cannot meet the requirements of the Canadian Council on Hospital Accreditation on medical staff functions".¹² The hospitals in smaller urban centres and rural areas have not kept up

⁶Province of Manitoba, *The Supply of Nurses*, Report of the Minister of Health's Committee, November 1966, pp. 79-80.

⁷*Ibid.*, p. 80.

⁸Canadian Nurses' Association, Brief to the Royal Commission on Health Services, p. 18.

⁹J. E. F. Hastings and W. Mosley, *Organized Community Health Services*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1966, p. 14.

¹⁰*Ibid.*, p. 64.

¹¹Victorian Order of Nurses (Ontario), Brief to the Royal Commission on Health Services, Toronto, May 1962, p. 7.

¹²J. E. F. Hastings and W. Mosley, *op. cit.*, p. 35.

with the advance of hospital services in larger centres. There is a relative scarcity of actual hospital beds as well. The 1961 Gini ratio of .347 for the distribution of hospital beds reflects the uneven distribution of beds for the population of Ontario (ratios for the other provinces can be found in Chapter 2).

The increased pressure on the hospital because of the economic, sociological and geographical characteristics of rural areas has been discussed in reports of two studies undertaken in the Antigonish area of Nova Scotia.¹³ Two sets of factors influence the demand for general hospital facilities. First, there is a positive association between age and hospitalization due mainly to chronic diseases which are typically of longer duration. In addition, there is a negative relationship between marriage and hospitalization, possibly because of the substitutability of household care.¹⁴ Since Antigonish has a high proportion of single and widowed inhabitants, as well as a high proportion of aged, hospital utilization would be expected to be (and is) high. Further, average length of stay in the hospital is significantly longer in less densely populated areas.¹⁵

The second set of factors concerns the organization of medical care in the region and the availability of substitutes for hospital care. One such substitute is the giving of medical care in the home, office and clinic. There has been no attempt to modify the effect of inadequate hospitals by making available abundant supplies of ambulatory care, but rather the deficient supply of physicians' services aggravates the situation.

It might be expected that the deficiency of physicians in rural areas would be decreased by the employment of other health personnel. However, this is not the case; for where physicians are scarce, so are other types of medical personnel.

Health Needs of the Rural Population

If the health needs of people in rural localities are significantly smaller than those of urban dwellers, the problems so far discussed have less importance. There is little evidence to suggest that this is the case. In fact, just the opposite would seem to be true.

Mott and Roemer hold that the incidence of disabling illness and accidents is significantly higher in rural areas than cities. They say that such is the case for most conditions, particularly diseases of the respiratory system, certain communicable diseases, and accidents. These are related directly to the economic,

¹³D. M. Connor, *The Development of Health Services in a Rural Region: Interim Progress Report*, St. Martha's Hospital and St. Francis Xavier University, Antigonish, March 1966; and J. M. Hoc, *Reorganizing Health Care in Antigonish and Its Surrounding Areas*, St. Martha's Hospital, Antigonish, July 1965.

¹⁴*Ibid.*, p. 67.

¹⁵*Ibid.*, p. 9.

social and occupational characteristics of the area. Their arguments supporting this position are persuasive, but their data are old.

More recent U.S. data based on income classes give a different picture; they show that there is a greater incidence of acute conditions in upper income groups. Various factors could weight the figures against a higher incidence in non-urban regions, including the higher return to hazardous urban occupations, putting such workers in higher income ranges; unemployment in low income urban groups, preventing a higher rate of injuries and to some extent communication with others having communicable diseases; and effective public health services in

TABLE 9.13

Comparison of Unadjusted with Age-adjusted¹ Incidence of Acute Conditions per 100 Persons per Year, by Family Income and Condition Groups, United States, July 1962 - June 1963²

Condition Group	All Incomes ³	Under \$2,000	Family Income		\$7,000 +
			\$2,000 — \$3,999	\$4,000 — \$6,999	
All acute conditions					
Unadjusted	218.8	203.5	201.4	224.7	235.6
Adjusted		215.9	204.5	216.2	232.5
Infective and parasitic diseases					
Unadjusted	24.4	14.3	16.3	27.8	30.6
Adjusted		17.2	16.7	25.9	30.4
Respiratory conditions					
Unadjusted	127.2	119.3	118.3	130.6	136.8
Adjusted		126.6	119.9	124.8	134.3
Digestive system conditions					
Unadjusted	11.2	16.3	12.9	10.6	8.7
Adjusted		17.3	13.1	10.5	8.5
Injuries					
Unadjusted	27.7	25.6	25.0	27.1	30.9
Adjusted		25.8	25.2	26.8	30.3
All other acute conditions					
Unadjusted	28.4	28.0	28.8	28.6	29.5
Adjusted		29.0	28.5	28.3	29.0

¹Adjusted to the age distribution of the total civilian non-institutional population of the United States.

²Excluded from these statistics are all conditions not involving restricted activity or medical attention.

³Includes persons with unknown incomes.

SOURCE: U.S. Department of Health, Education and Welfare, *Medical Care, Health Status and Family Income*, Series 10, No. 9, U.S. Government Printing Office, Washington, D.C., May 1964, p. 66.

urban areas. In addition, the very fact that their income is low may prevent them from seeking care; thus, reported cases may not be a good indication of the real incidence. For these reasons, the data in Table 9.13 should be interpreted with caution.

Chronic conditions are another matter, for they are substantially higher in low income groups (see Tables 9.14 and 9.15).

Furthermore, for many years the proportion of the population under twenty and over sixty has been higher in rural than urban areas, and the trend is for working age population figures to become relatively lower in rural counties as time passes. "The perennial bumper crop of farm children and the harvesting of nearly half that crop by our cities result in a disproportionately low number of persons in the prime of life in rural areas."¹⁶ This statement, based on 1940

TABLE 9.14
Percentage of the Population with One or More Chronic Conditions,
by Family Income, Sex and Age, United States, July 1962 - June 1963

Sex and Age	All Incomes	Under \$2,000	Family Income		
			\$2,000 — \$3,999	\$4,000 — \$6,999	\$7,000 +
<i>Both sexes</i>					
All ages	44.5	57.6	46.5	40.6	42.9
Under 15 years	19.5	19.2	19.4	18.8	20.8
15-44 years	46.0	48.3	45.3	46.2	46.6
45-64 years	64.3	76.8	68.3	62.3	61.1
65 + years	81.2	86.4	81.4	77.2	76.2
<i>Male</i>					
All ages	43.2	54.9	45.3	39.9	42.3
Under 15 years	21.2	21.0	21.4	20.1	22.9
15-44 years	43.9	45.2	42.5	44.7	44.9
45-64 years	62.6	78.3	67.6	60.8	59.5
65 + years	79.9	86.0	81.2	76.0	72.7
<i>Female</i>					
All ages	45.7	59.7	47.7	41.3	43.5
Under 15 years	17.7	17.5	17.3	17.4	18.6
15-44 years	47.8	50.9	47.9	47.6	48.2
45-64 years	65.9	75.9	68.8	63.8	62.9
65 + years	82.2	86.7	81.7	78.2	79.2

SOURCE: U.S. Department of Health, Education and Welfare, *Medical Care, Health Status and Family Income*, Series 10, No. 9, U.S. Government Printing Office, Washington, D.C., May 1964, p. 53.

¹⁶F. D. Mott and M. I. Roemer, *op. cit.*, p. 149.

TABLE 9.15

Total Population, and Number and Percentage Distribution of Persons by Chronic Condition and Disability Status, According to Area of Residence, United States, July 1963 - June 1965

Area of Residence	Total Population	Persons with no chronic conditions	Total	Persons with 1 + chronic conditions			
				With no limitation of activity	With limitation but not in major activity	With limitation in amount or kind of activity	Unable to carry on major activity
All ages							
All areas	100.0	54.2	45.8	33.7	3.3	6.6	2.2
SMSA	100.0	51.1	44.9	34.4	3.0	5.6	1.9
Outside SMSA:							
Non-farm	100.0	52.3	47.7	33.1	3.6	8.0	2.9
Farm	100.0	54.0	46.0	29.5	4.0	10.0	2.5
Age 65 years +							
All areas	100.0	17.2	82.8	34.0	7.3	26.9	14.6
SMSA	100.0	19.9	80.1	36.7	6.7	23.8	12.8
Outside SMSA:							
Non-farm	100.0	13.1	86.9	30.7	8.2	30.5	17.5
Farm	100.0	13.6	86.4	27.5	8.2	35.5	15.1

SOURCE: U.S. Department of Health, Education and Welfare, *Age Patterns in Medical Care, Illness and Disability: United States—July 1963–June 1965*, Series 10, No. 32, U.S. Government Printing Office, Washington, D.C., p. 54.

data, would be stronger on the basis of current figures. However, this factor is said to have a direct influence on the health status of the rural population. That is what J. M. Hoc calls the theory of social causation of illness. "Family disruption, created by the rural exodus, creates illness and medical needs for individuals who remain in these declining communities, and thus makes the region an area of high use of health care facilities."¹⁷ This hypothesis appears to be sound and, at the time of his paper's publication, Dr. Hoc was launching a research program to test it empirically.

In summation, it would appear that there are health problems in rural areas which could well outweigh any actual lower incidence of acute illness. Whether rural health needs are in fact slightly greater than those of urban dwellers is difficult to determine. It does seem that the rural population could be receiving less care and a lower quality of care than the urban population. In any case, it is important that the method of providing health care in rural areas be as efficient as possible—that is, the most economical or efficient method that is consistent with a given quality of care. The necessity of setting forth an efficient method of services is especially urgent with the forthcoming implementation of a

¹⁷J. M. Hoc, *op. cit.*, p. 72.

comprehensive national medical care plan, which is designed to remove to a large degree any economic restraints which now exist on the rural population's demand for medical care.

Alternatives for Providing Health Care

To determine the best way of providing health care in rural areas, one would have to consider a vast range of alternatives. We restrict ourselves in this study to a consideration of only two such alternatives: the general practitioner, and the public health nurse practitioner.

Use of the general practitioner alone would seem to require, at the very least, increasing the number of such personnel in rural areas to the level recommended in the Royal Commission on Health Services. For example, the number of additional general practitioners required in selected Ontario rural counties could be calculated by the following method. Using the recommended physician: population ratio suggested as the minimum,¹⁸ we find, on the basis of 1961 population figures, the required number of physicians; we then subtract the actual number of physicians in the counties at that time. The resulting figures are biased for purposes of determining the shortage of general practitioners, because both ratios are for all physicians including specialists. But we can use the results as an approximation (especially with rounding down of figures), because the number of specialists involved would be less than one, except in the case of the general surgeon. The population has not grown significantly in these counties since 1961,¹⁹ and it seems most unlikely that the number of

TABLE 9.16
Shortage of General Practitioners in Six Rural Counties of Ontario, June 1961

County	Popula- tion 1961	Req'd G.P.'s at Ratio 1:857 (rounded down)	Actual Number of Physicians (June)	Shortage (Req'd minus Actual) 1961	Popula- tion 1966
Bruce	43,036	50	29	21	43,085
Glengarry	19,217	22	11	11	18,181
Haldimand	28,197	33	17	16	30,020
Lennox and Addington	23,717	27	13	14	25,202
Manitoulin	11,176	13	5	8	10,544
Prince Edward	21,108	24	18	6	21,307

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, pp. 323-324.

¹⁸S. Judek, *op. cit.*, p. 253.

¹⁹DBS, *Census of Canada, 1966*, Advance Bulletin A-2, Catalogue No. 92-622, Queen's Public Health Position.

physicians has increased. Our calculations on the basis of data contained in Judek's study are shown in Table 9.16.

There are many shortcomings to this approach. These include: the abstraction from the need for specialists; the inherent problems of practising in isolated areas (greater travelling distances, isolation from centres of professional knowledge, lack of auxiliary services and facilities); and the effect of rural life on the physician himself. Because of the relatively static total population of our five counties from 1961 to 1966, with an increase of only 1,088, we project this increase to give a total population of 149,167 in 1971. With the physician:population ratio of 1:857, the required number of physicians is 175 — 81 more than the actual number in 1961. We assume that this is the number of physicians that should be provided by 1970.

The total social cost of providing these additional services includes the cost to society of medical education, the cost of lost production while the student is in medical school, plus the cost of maintaining the physician in his rural practice. For illustrative purposes, we roughly estimate these costs for 1971 on the basis of 1961 data, which we projected by a constant rate of inflation.

Considering capital costs of medical schools, the estimated expenditure in both 1966 and 1971 is ten million dollars.²⁰ This amount is assumed to be the same for intervening years. During his four years in medical school, the individual student is allotted that portion of the cost which is the reciprocal of the average number of medical students. When multiplied by the total capital cost of the four years, this gives a rough indication of the capital cost per student. The figure using average admissions to internship for the years 1965-1969 is \$8,737.²¹

MacFarlane estimates the annual operating cost per student at \$5,200. Allowing for a 3 per cent annual increase in costs from 1962 to 1969, the figure for the four years is \$26,208. Of this operating cost, the student pays about 11 per cent, leaving a social investment of \$23,325. Total direct cost is thus \$32,063.

Assuming an annual opportunity cost of \$5,000 while the student is in medical school, total cost now becomes \$52,063. Although teaching hospitals are generally much more expensive than other community hospitals,²² we will assume that the additional cost per interne balances the interne's service to society (we do this largely because relevant data are not available). The total cost can be amortized over the thirty-year working life of the physician, assigning a cost of \$5,582 for the first year.

Now it is necessary to add the income required to compensate the physician for rendering services in his rural practice. The average net earnings of a general

²⁰*Report of the Royal Commission on Health Services*, Vol. I, Queen's Printer, Ottawa, 1964, p. 851.

²¹J. A. MacFarlane, *op. cit.*, p. 195.

²²*Ibid.*, p. 122.

practitioner in 1960 were \$14,940,²³ and the ratio of expenses to gross income was about 35 per cent.²⁴ This gives a gross income of \$22,985. To find the gross income for 1971, this figure is inflated according to the estimated annual percentage increase in physicians' gross income of 3.4 per cent for 1961-1966, 2.8 per cent for 1966-1969, and 6.2 per cent for 1969-1971. Assuming that a federal government comprehensive care program is implemented in 1969,²⁵ our figure for gross income is \$34,418. However, it must be remembered that physicians setting up practice have lower incomes during the first years of practice than they could expect from an established practice. Data given by Judek²⁶ allow us to calculate the income of the first years at 74 per cent of the average net income for all general practitioners in Ontario, or \$25,469. This, we assume, is the amount that will be paid to the physician for his services in 1971. An implicit assumption has been that the additional services will be provided by new physicians — that is, those just emerging from internship. It is not likely that many established physicians would be persuaded to move to a rural practice. If they did, their income would have to be higher, depending on the number of years of experience. At the same time, the cost of educating them would have been lower, in absolute terms.

Another point that should be emphasized is that the calculations have been made on the basis of average incomes for Ontario, not those of rural areas. This is important for two reasons. First, one of the important reasons why rural areas have relatively fewer physicians than the average for Ontario is the lower financial return of a rural practice; incomes are consistently below those of urban physicians, and hence below the average incomes of physicians. This fact is seen in Table 9.17.

TABLE 9.17
Average Total Net Income from Private Practice of Active Civilian Physicians,
by Size of Community in which Located, Canada, 1960

Size of Community	Average Net Income	
	General Practitioner	Specialist
Canada	13,750	18,560
Rural Areas	12,350	13,420
Urban Areas		
Less than 10,000 population	14,020	14,030
10,000-100,000 population	15,540	13,280
Over 100,000 population	13,280	18,990

SOURCE: S. Judek, *Medical Manpower in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 229.

²³S. Judek, *op. cit.*, p. 364.

²⁴Canada, *Royal Commission on Health Services*, Vol. I, Queen's Printer, Ottawa, 1964, p. 814.

²⁵*Ibid.*, p. 812.

²⁶S. Judek, *op. cit.*, p. 372.

Accordingly, if one is to attract and keep a larger number of high quality physicians in rural practice, it will probably be necessary to pay them at least the average income of physicians in Ontario. Indeed, for such a program to be successful, rural physicians will probably have to be paid an income substantially in excess of the average in order to compensate them for their isolated existence.

The second reason is that, with the implementation of a national medical care program, the per capita demand for services should converge and thus the income of all general practitioners should tend to converge.

The total cost of increasing the number of physicians in rural areas would thus be quite high. We suspect that the largest part of these costs would take the form of payments made for the purpose of attracting and maintaining physicians in relatively isolated areas.

One possible answer to the problem of providing health care in rural areas involves the use of auxiliary, paramedical, or allied health personnel for many tasks which now, if performed, are performed by the physician. These tasks would be ones that do not require a high level of qualifications. In preceding sections of this study, we have shown that the employment of such persons not only saves much of the physician's time for more important matters, but also often results in the lesser duties being performed more efficiently. Accordingly, we now consider the use of a more highly trained auxiliary, a practitioner in his or her own right, which we call the public health nursing practitioner.

From the outset it should be emphasized that such a role is not the same as that of the public health nurse of today, and it does not replace her. Although many of the areas with which the public health nurse concerns herself in caring for the health needs of the community would be included in the duties of the new personnel, the public health nursing practitioner would be prepared to accept much greater responsibility. While working with the new practitioner, the public health nurse could devote more of her time to other necessary duties, including health education and large-scale preventive programs. The same result would be obtained if the current public health nurse were more highly educated and able to take over many of the responsibilities presently left to physicians, while the auxiliary nursing personnel performed the more routine duties now assigned to the public health nurse. The role of the physician would be to deal with the more serious health problems of the entire rural population; in addition, he would act as a consultant. At the same time, physicians would have to be conditioned to a routine of referring simpler problems to the nursing practitioners.

The present role of public health nurses is two-fold. First, by the constraints of legislation, staff shortage, budget and precedent, they have been concerned primarily with preventive activities, such as those related to communicable diseases. These have involved the tasks of immunization, screening and environmental studies. Diagnosis and treatment have been restricted to applications in

the primary preventive process; most medical decisions are referred to physicians. Home or bedside care also has been bypassed; it is left to the physician at one extreme, or to the relatives of the patient at the other. As was pointed out earlier, through voluntary nursing agencies, the urban population has been more fortunate than that of small communities and isolated areas. J. M. Mather suggests that the very existence of such agencies is an expression of the inadequacy of the official health agency to provide for this need. However, the continual increase of costs and the shortage of funds is imposing serious constraints on these voluntary agencies.²⁷

The second role of public health nurses is an institutional one, that of prevention and health maintenance as school nurses and welfare agency nurses. Their activities here, too, are greatly restricted not only by their limited duties and the requirements of physician referral, but also by the often severe limitations imposed by the agencies to whom they are attached. The increasing importance of school nursing activities in the United States is shown in Table 9.18.

TABLE 9.18
Ratio of School Nurses to Child Population, United States, 1950-1964

Year	Staff PHN's Local Boards of Education	School-Aged Children	Nurses per 100,000 School-Aged Children	Children per Nurse
1950	5,706	30,724,000	18.6	5,384
1960	10,687	43,881,000	18.6	3,395
1964	12,800	48,342,000	26.5	3,142

SOURCE: H. H. Hudson and M. R. Lester, "Nurses in Public Health", *American Journal of Nursing*, Vol. 65, April 1965, p. 104.

The U.S.S.R. has long had a comprehensive system of medical care employing skilled paramedical personnel. One type of health care worker has a role similar to that we are proposing for the public health nursing practitioner. The duties of feldschers were outlined in Chapter 4, but we will restate them briefly. Feldscher-midwife stations have been established in rural districts to make medical assistance more accessible to the population where hospitals and physicians have a large area to cover. The feldscher gives medical assistance in his office or at the patient's home and, if the condition is serious or requires consultation, sends that patient to the district hospital or discusses the case with a physician. "The feldscher is largely independent. He has the right not only to treat patients and write out prescriptions, but also to issue disability certificates."²⁸ He provides the population of the district with free medical help and carries out regular clinical check-ups of the population. The feldscher is under the direct supervision of a physician,

²⁷J. M. Mather, "The Need for a Truly Generalized Public Health Nursing Program", *Canadian Journal of Public Health*, Vol. XL, April 1952, pp. 143-150.

²⁸U.S.S.R. Ministry of Health, *The Organization of Public Health in the U.S.S.R.*, p. 109.

however, and must send "patients whose condition has not been definitely diagnosed and those requiring medical attention" to a hospital.²⁹ Various types of contagious diseases are guarded against by testing and, if necessary, treated under the supervision of a district physician. Thus, while physicians are still ultimately responsible for the health of the population and deal with serious or doubtful cases, much of their time and skill is reserved for problems requiring their highly trained knowledge by the use of "middle echelon" personnel.

As has been mentioned, the extension of the duties of the public health nurse is not a new idea. Indeed, there have been limited attempts to make such a move in recent years. In the following section we will discuss the experiments that have been done and the possible use of the personnel in obstetrical care, well-baby and child care, and home nursing.

The use of paramedical personnel in prenatal, delivery and postnatal medical care has been examined at length in Chapter 8 and so is passed over quickly here. The nursing practitioner should provide care from conception through to postpartum whenever physicians are not available or are too busy to do so. They can relieve those physicians who now spend much of their time in this largely routine process.

The importance of this service goes deeper in our case. "It is in the village and the rural areas and particularly in the sparsely populated sections of the country that the maternity case has the most inadequate medical and nursing service, or none at all."³⁰ The socio-economic and geographic characteristics of these areas lead to an above-average tendency for high risk pregnancies.

Nesbitt, Schlesinger and Shapiro³¹ list the following handicaps affecting safe childbirth: pregnancies at a very young or advanced age, pregnancies out of wedlock, a poor obstetrical history, low socio-economic status, poor habits of medical care, heavy work, prolonged periods of attempted conception, impaired maternal health, poor nutrition, endocrine imbalance, blood incompatibilities, and anatomic defects. Clearly several of these factors characterize rural life. Given these facts, an important influence on the incidence of prenatal mortality is the quality, quantity and timing of obstetrical care.

Nesbitt, Schlesinger and Shapiro go on to indicate the problems that can arise from medical neglect of these high risk pregnancies: early or late foetal mortality; premature births; congenital anomalies; neonatal mortality; as well as neonatal morbidity leading to sublethal brain injury; cerebral palsy; epilepsy; mental

²⁹*Ibid.*, p. 185.

³⁰F. H. M. Emory, *Public Health Nursing in Canada*, Macmillan, Toronto, 1953, p. 292.

³¹P. E. I. Nesbitt, E. R. Schlesinger, and S. Shapiro, "Role of Preventive Medicine in Reduction of Infant and Perinatal Mortality", *Public Health Report*, Vol. LXXXI, August 1966, pp. 691-702.

retardation; speech, aural and visual disabilities; emotional-social maladjustments, and many other problems.³²

The nursing practitioner can be used effectively in the area of maternal-child health. Through continuing clinical investigation and assessment, she can carry out not only an active preventive program but also, under supervision, treatment tasks. In addition to physical problems, the presence of potentially dangerous emotional, cultural, social and environmental conditions indicate the need for more intensive investigation and continuing care. Modern medical science has provided the opportunity for fairly routine programs of investigation. If these were used on a wide scale, we could see a significant improvement in the survival and health situation for rural mothers and new-born children.³³ This is particularly important because it has been shown through experience that current methods of health supervision do not succeed among minority groups and low income families, which, in addition, require the most intensive care. A high percentage of such deliveries have no or very late prenatal and antepartal care.³⁴ "The Oak-Chip Experiment" showed that when public health nurses assume the major responsibility for health services to families, including key roles in health maintenance and high risk prenatal supervision, through clinical conferences, examinations, testing and home visiting, there is great potential for success. The advantages would be even further extended by adding responsibility for diagnosis and treatment under restricted conditions.

Two examples of perinatal conditions that have severe consequences, yet are easily detected, can be given as examples of the use of public health nurses on a fairly elementary level. Toxemia is a leading cause of premature labour and maternal death or disability. This can be prevented largely by early screening, correction of preliminary symptoms, and careful prenatal supervision. Phenylketonuria is a much rarer condition transmitted by genetic patterns. If the parents are carriers, the probability is 1:4 that the child will be born with the disease, and 2:4 that it will be a carrier. The carrier rate for the population is 1:50 to 1:100. If unchecked, PKU leads to severe mental retardation; but with early diagnosis through simple screening tests and with dietary therapy, the child has an excellent chance of developing normally. The role of the public health nurse is not only to test for PKU, but to ensure that treatment is carried out by assessing parental capability to manage the severe diet. She must educate the family and give supervision.

The care of the mother and child does not stop at prevention and treatment of physical abnormalities. Preparation of the mother and the family as a whole through techniques of counselling and education are of utmost importance,

³²*Ibid.*

³³*Ibid.*, pp. 700-701.

³⁴W. Johnston, "Nursing in the Oak-Chip Experiment", *American Journal of Nursing*, Vol. LXV, March 1965, p. 90.

especially for primiparae and other high risk cases. Hygienic and emotional aspects of pregnancy, childbirth and infant care are areas where the nursing practitioner, with help from the general public health nurse, can vitally aid and supplement the physician. Although the period of immediate interest is that from conception to six weeks following birth, it is also advantageous to educate non-expectant mothers and their families in these matters.

Concern has been expressed about extending such a program to young married couples and, more recently, to adolescents. Aside from physical examinations, such potential parents need to be psychologically prepared for their future roles, and to be made aware of the problems that they may face. They must be taught the fundamentals of hygiene and health preservation. Family planning is a part of the total maternal-child health service and is necessary for adequate care of those who desire and need it. In some rural areas, the nursing practitioner would be the only constantly available medical help the patient would have access to, and those people who are unable to seek counselling from a physician should not lack this health service any more than others.

The Los Angeles County Health Department provides prenatal care for patients who need it, and has completed a study of the instruction program given by public health nurses. A study group of patients consisting of a cross-section of the population was divided into four sections. Three of them were instructed in prenatal health practices, each by a different method of prenatal clinic classes, home visits, and individual counselling. No teaching or counselling was given to the control group. Comparison of the mean scores of the groups showed highly significant differences ($p .05$), as shown in Table 9.19.

The final study³⁵ we will note took a cross-section of pregnant women registering in a New York hospital. Most were high risk cases because of various socio-economic factors—including being coloured, medically indigent, poorly educated; living in substandard housing; and being newly-arrived in the area. The purpose of the study was to determine the effect of an invigorated public health nursing program in maternity care. Many of the women responded favourably and had “a more satisfactory experience during pregnancy and at delivery than might have been the case had the service of the public health nurse not been available”.³⁶ The study noted the need and acceptance of the public health nurse; the magnitude and number of needs; the scope and importance of suspicions, fears and lack of knowledge; and the lack of sophistication in ways of getting even the simplest help, especially with respect to community services. In this last case, the nurse became a liaison between the family and the available medical resources. It was concluded that pregnant women often have need of more help than the clinic and physicians are able to provide, even in the largest city of

³⁵A. F. Le Mat, “The Public Health Nurse in Maternity Service”, *Nursing Outlook*, Vol. XII, October 1964, pp. 59-61.

³⁶*Ibid.*, p. 59.

TABLE 9.19
Comparison of Mean Scores of the Los Angeles County Health Department
Prenatal Instruction Study, for Study and Control Groups,
by Type of Instruction and Background Variables

Background Variables	Mean Scores Study Groups			Control Group
	Individual Counselling	Home Visits	Class Instruction	
Parity:				
Primipara	20.41	21.85	18.19	13.23
Multipara	22.46	21.73	19.96	15.35
Race:				
Mexico American	21.06	20.90	17.14	14.61
Negro	19.00	20.67	16.89	13.25
Caucasian	24.28	23.09	22.56	17.28
Age:				
Under 20	21.41	22.31	17.67	15.69
20-30	22.44	21.60	20.60	13.58
Over 30	23.60	21.00	19.00	15.57
Education:				
Grade School	20.50	22.10	16.07	11.27
High School	22.43	21.19	20.00	15.88
College	23.00	25.50	23.00	29.00
Previous LA County	22.94	20.33	20.64	15.14
Prenatal Other	22.92	23.41	17.50	16.55
Training None	21.63	21.73	20.00	14.22
All Patients	22.63	21.77	19.47	15.13

SOURCE: I. Dalzell, "Evaluation of a Prenatal Teaching Program", *Nursing Research*, Vol. XIV, Spring 1965, pp. 160-163.

the United States. The public health nurse had a major role in guidance, education and interpretation (note that this was only for the small selection of patients with unusual symptoms that thus came to her attention). Another conclusion was that the public health nurse must also give services in the home. It was noted that the degree of medical and nursing competence of the individual nurse had a significant bearing on her success in the program. Her skill in establishing herself with the family, her effort and resourcefulness in arousing interest in their health, her sensitivity to individual needs, and her diagnosis, prognosis, and evaluation of the case as a whole were most important.

For many years, there has been dissatisfaction with the traditional method of conducting well-child health care programs, particularly in the clinic setting. Many

physicians feel that their time is wasted by routine matters. A number of these tasks could be dealt with adequately by nurses with their present training. Other tasks of a more complex nature, also could be handled, with sufficient preparation. In Chapter 6 we noted the study by Bergman, Dassel and Wedgwood which showed that four paediatricians spent half their time with patients on well-child care and nearly a quarter of their time on minor respiratory conditions. According to another study, neither the well child nor the more serious cases are receiving sufficient care.

Traditionally, the public health nurse, who has frequent intimate association with families in her district, coupled with a knowledge of community health and welfare resources, was being under-utilized; by contrast the conference physician required to see each mother and child hurriedly, was overburdened with routine procedures and appraisals, and was left with insufficient time for attending to the more complex medical problems which may be presented by individual patients.³⁷

With the use of nursing practitioners, parents have a better opportunity to discuss problems which they might consider too minor to bring to the attention of a busy physician. Thus, any deviations from a normal healthy condition may be detected and appraised, and either treated by the nurse or referred for further diagnosis. Not only physical but also emotional and mental aberrations can be guarded against.

Experiments with public health nurses so far have done little to extend the level of responsibility normally accorded to them, although they do demonstrate the potential for expansion of their role. In a study of a Colorado clinic in 1960-1961, it was found that due to increased child population and shortages of physicians, physicians were forced to give priority to the treatment of illnesses and to delegate additional responsibilities to the public health nurses. The nurses still could not diagnose illnesses or suggest treatment; but they interviewed patients, gave physical inspections, observed emotional status, made suggestions to patients, and referred them to the physician if there was a problem. The physicians checked any abnormalities and served as consultants. As nurses acquired more responsible duties, volunteers assumed many routine tasks previously performed by the nurses.

Another approach was tried at an experimental child health conference in Berkeley, California.³⁸ Under the standing orders and supervision of the paediatrician, the nurse has immediate and continuing responsibility for counselling, physical examinations, and routine preventive measures such as immunization. The physician is available for comprehensive examinations or consultation as required. Some 59 per cent of the staff nurses favoured expansion of their role; 86 per cent of those from non-metropolitan areas favoured this expansion; and 82

³⁷E. Siegel, D. Dillehay, and C. J. Fitzgerald, "Role Changes within the Child Health Conference: Attitudes and Professional Preparedness of Public Health Nurses and Physicians", *American Journal of Public Health*, Vol. LV, June 1965, p. 832-841.

³⁸*Ibid*, pp. 832-841.

TABLE 9.20**Berkeley, California Child Health Conference Experiment Reported Policy Stand on Public Health Nurse Assuming Primary Responsibility**

Public Health Position	Number	Yes (%)	No (%)	No Answer (%)
Staff PHN	191	59	39	2
Supervisor, PHN	24	88	12	0
Director, PHN	10	80	10	10
Maternal—child health program director	9	56	44	0
Clinicians	25	32	64	4

SOURCE: E. Siegel, D. Dillehay, and C. J. Fitzgerald, "Role Changes within the Child Health Conference: Attitudes and Professional Preparedness of Public Health Nurses and Physicians", *American Journal of Public Health*, Vol. LV, June 1965, p. 835.

TABLE 9.21**Desired Role for the Physician if the Public Health Nurse Assumes Primary Role (among those favouring expanded role)**

Public Health Position	Number	Need for Presence of Physicians during CHC				
		Portion only %	Periodic %	Through-out each %	Not present %	No answer %
Staff PHN	112	34	27	32	5	1.8
Supervisor, PHN	21	29	33	24	5	9
Director, PHN	8	38	50	12	0	0
Maternal—child health program director	5	20	40	20	0	20
Clinicians	8	38	25	25	0	12

SOURCE: E. Siegel, D. Dillehay, and C. J. Fitzgerald, "Role Changes within the Child Health Conference: Attitudes and Professional Preparedness of Public Health Nurses and Physicians", *American Journal of Public Health*, Vol. LV, June 1965, p. 835.

per cent of those who already had a greater than traditional responsibility favoured the expansion. Directors and supervisors favoured strengthening the role of staff nurses. Especially in non-metropolitan areas, most nurses favoured a primary role for themselves, but they also expressed a need for the presence of a physician for at least part of every session. The results of the study are shown in Tables 9.20 and 9.21.

Physicians had reservations about family acceptance and about technical competence. Nurses opposing the expansion did so partly because of their professed lack of knowledge. The Child Health Knowledge questionnaire supported this, with clinicians achieving higher scores (see Table 9.22).

TABLE 9.22

Child Health Knowledge Scores, Averages and Standard Deviations

Public Health Position	No.	Scores for Each Group		Favour Primary Role by PHN			
		Mean	S.D.	Yes (N=151)		No (N=97)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Staff PHN	191	14.0	3.6	14.3	3.4	13.6	3.9
Supervisor, PHN	24	14.1	3.2	14.0	1.0	14.7	3.4
Director, PHN	10	13.2	3.8	13.3	4.5	12.0	0
Maternal-child health program director	6	17.3	5.5	16.0	4.4	18.7	8.2
Clinicians	24	17.2	4.8	17.0	4.0	17.9	6.2

SOURCE: E. Siegel, D. Dillehay, and C. J. Fitzgerald, "Role Changes within the Child Health Conference: Attitudes and Professional Preparedness of Public Health Nurses and Physicians", *American Journal of Public Health*, Vol. LV, June 1965, p. 839.

Another important source of child health care, for later ages than many of the children attending well-child clinics, is the schools. The public health nurse and her full-time school nurse counterpart traditionally are important sources of health care and inspection. However, once again responsibilities are strictly limited. Under our proposed program, nurses would be adequately trained to meet common problems and an automatic referral to a physician would not be necessary. This is especially beneficial in rural areas. Not only would primary medical care be more efficient; but because of the tendency of rural families to ignore follow-up suggestions, due to the difficulty and expense involved, it would also reach more children. The school is a powerful vehicle by which health education can be provided, particularly in reference to preventive measures and hygiene. Thus the nurse conveys good health practices not only to children, but through them to their parents and hence to a large proportion of the population. In rural areas, this may be a primary form of medical service for many people.

Many health professionals and organizations have declared the importance and need for improved services in home nursing programs. The growing pressure results from two developments: the desire for better care of the sick, and the desire for more economic services to be a substitute for and supplement to hospital care.³⁰ Recent trends have made the hospital the place to go when one is sick, placing a heavy strain on facilities. In rural areas, hospital facilities are simply not available. Professional home care can provide adequate care, especially in conjunction with hospital outpatient facilities, for many non-critical and long-term illnesses. Also, the patient is able to remain in the familiar surroundings of the family and home. The qualifications of our nursing practitioner in this setting

³⁰Canada, *Royal Commission on Health Services*, Vol I, Queen's Printer. Ottawa, 1964, p. 623.

further increase efficiency by reducing the duplication of visits by doctors and nurses, although the physician would still be ultimately responsible and kept informed by the nursing practitioner. The home visit also provides the best opportunity to promote health through education techniques and first-hand suggestions concerning personal and environmental hygiene and preventive measures. Home nursing programs should not be substituted where needs can best be met in a hospital (unless such care is not available); but they offer a cheaper alternative, if appropriate, and allow a more efficient use of hospital facilities through earlier discharges and perhaps through removing the need for admittance.

The President's Commission on the Health Needs of the Nation⁴⁰ has specified seven objectives of home care:

- 1) To enable the patient to remain in his own home and at the same time receive good health care and comfort.
- 2) To enable him and his family to reach an optimal social and emotional adjustment.
- 3) To develop an effective rehabilitation program for the patient at home.
- 4) To develop an education program within home care activities.
- 5) To meet these objectives at a cost lower than comparable care in an institutional setting.
- 6) In meeting these objectives, to use more effectively acutely needed hospital beds by allowing earlier discharge and maintaining the patient at home thus reducing readmissions.
- 7) To provide good care in the home for terminal illnesses.

Among the most frequent situations where home care is required are cases of chronic illness. These illnesses are long-term and often do not require constant medical or nursing supervision. The majority of patients in this category are elderly. Concern over the problems of the aged and over chronic disease has increased with the growth of the proportion of our population over sixty-five. This situation will be intensified in coming years. The data contained in Table 9.14 show that more than 80 per cent of persons sixty-five years and over had one or more chronic conditions, with even higher proportions for low income groups. Low income and an older average age of population characterize the rural scene. Data in Table 9.15 show a higher incidence of chronic conditions for all people and the elderly in these areas. Rural areas also tend to have a higher degree of disability in relation to chronic illness. The U.S. National Health Survey for 1957-1959 found that the civilian non-institutionalized population over sixty-five had an average of 14.2 days of bed disability per year.⁴¹

⁴⁰President's Commission on the Health Needs of the Nation, *Building America's Health*, U.S. Government Printing Office, Washington, 1953.

⁴¹A. Testoff and E. Levine, "Nursing Care Supplied to Older People in Their Homes", *American Journal of Public Health*, Vol LV, April 1965, p. 541.

The nursing practitioner thus could contribute greatly to home care needs where there is high demand and little attention. Testoff and Levine found that many conditions could be cared for under a home care program, and that under the present type of service provided by home nursing, individual visits did not involve a great deal of time. Also, many people are willing to pay for the service. If home care were provided under a medical plan, greater use could be made of visiting services.⁴² Some of the results of the Testoff and Levine study are shown in Table 9.23.

TABLE 9.23
Distribution of Patients Sixty-five Years of Age and Over Receiving Nursing Care at Home, and Average Number of Minutes Spent Visiting Each Patient, by Primary Reason for Nursing Service, United States, April 30, 1963

Primary Reason for Nursing Service	No. of Patients	Percentage of Patients	Average Length of Visit (Minutes)
TOTAL	17,501	100.0	40
<i>Chronic disease, total</i>	14,371	82.2	41
Cardiovascular disease	4,112	23.5	39
Cerebral vascular accident	2,263	12.9	53
Cancer	1,239	7.1	46
Arthritis	1,269	7.3	44
Diabetis	1,777	10.2	30
Chronic nontubular	209	1.2	41
Respiratory conditions			
Parkinson's disease	243	1.4	47
Other chronic	3,259	18.6	36
<i>Non-communicable disease total</i>	1,960	11.1	41
Injuries	635	3.6	51
Mental Illness	200	1.1	42
Other	1,125	6.4	35
<i>Communicable disease total</i>	523	3.0	30
Tuberculosis	410	2.4	30
Other	113	0.6	32
<i>Health promotion</i>	524	3.0	26
<i>Undiagnosed</i>	123	0.7	39

SOURCE: A. Testoff and E. Levine, "Nursing Care Supplied to Older People in Their Homes", *American Journal of Public Health*, Vol. LV, April 1965, p. 544.

⁴²*Ibid.*, p. 546.

As the data in Table 9.23 show, not all home care is for chronic illnesses, and it is in acute cases that the improved qualifications of a nursing practitioner can allow the expansion of home services. Further, this service has not been confined to the elderly, and increasingly will not be, with the increase in home care of acute illnesses. The Testoff and Levine study showed that the median age for patients visited at home by nurses was forty-seven years and that 15 per cent of the cases were children under fourteen years of age.⁴³

Two experimental projects involving hospital-based home care programs for children can be noted. A system of referral was established between the Brooklyn Visiting Nurse Association and a Brooklyn hospital. Nurses visited children with acute respiratory infections who were released from hospital early, being no longer in critical condition but still requiring daily treatment and supervision. This procedure freed beds for those seriously ill and those needing constant supervision or facilities available only in the hospital. The project was so successful that it has grown to include other conditions, including long-term patients and home emergencies.⁴⁴

The Montreal Children's Hospital instituted a home care program in 1964 which has "more than justified its existence".⁴⁵ This program was designed as follows:

To give a new dimension to the short and long-term care of *selected* children with acute or chronic, complicated illness. The project aims to shorten the length of hospital admission, to reduce or prevent re-admission or to improve the existing care at home of these selected children by *organizing* and co-ordinating their management and by taking hospital or community services to their homes.⁴⁶

A pilot home care study was started in Toronto several years ago to see how much of the available medical resources should be shifted to developing this alternative to hospital care. It revolved around current community services and was not confined to chronic cases, the elderly, or indigent families. It was found 1) that patients with protracted illnesses responded better to care in the home; 2) that families more readily accepted the responsibility of discharged patients if home services were available; and 3) that hospitals were more willing to admit patients if provision was made for returning them to the community as soon as possible. Concerning cost, a crude average daily cost of home care, excluding physicians' services, medications and administrative costs, was calculated at \$2.57; this was the result of a combination of \$3.47 for cases lasting under ninety days and \$2.41 for cases over ninety days. On the other hand, daily cost of patients in acute and

⁴³*Ibid.*, p. 543.

⁴⁴R. M. Thompson, "Pediatric Referrals in a Visiting Nurse Program", *American Journal of Nursing*, Vol. LXIV, February 1954, pp. 76-79.

⁴⁵A. Ross, Physician-in-Chief, The Montreal Children's Hospital, in a letter to R. D. Fraser, Queen's University, August 1, 1967.

⁴⁶*Ibid.*, in particular, see the attached statement of the objectives of the Home Care Program.

chronic hospitals was \$3.50. During the first twenty-six weeks of operation, 1,648 hospital days for seventy-seven patients were saved. The results supported the need for a permanent program.⁴⁷

The need by all patients for home care service, and the possible results even when public health nurses are restricted in their responsibilities, have been further revealed in a study by E. O. Quigley and L. R. Warner.⁴⁸ Of the 100 patients involved, only 4 per cent were referred to the service by hospitals and 6 per cent (mostly maternal-child health) by physicians; about 49 per cent required short-term care and 38 per cent, long-term care. All were visited more than once. Altogether, 651 nursing needs were assessed at the time of admission to the program: 42 per cent were for physical care and treatment, 29 per cent were for nutritional problems, and 19.8 per cent were related to behavioural and emotional problems. Only 15.5 per cent of the needs were diagnosed as medical needs. A total of seventy-seven conditions seemed to require the supervision of a physician. Data in Table 9.24 indicate the attention needed for various reasons at the beginning and end of the study period.

TABLE 9.24
Nursing Care Needs at Beginning and End of
Public Health Nurse Home Care Study

Type of Need	Number of Patients and Needs	Percentage Requiring Attention of PHN at beginning	at end
Physical Care	90 (255 Needs)	37.2	4.7
Nutritional	89 (189 Needs)	57.1	7.0
Medical Care	— (310 Needs)	58.7	28.7

SOURCE: E. O. Quigley and L. R. Warner, "Measuring Patient Progress", *Nursing Outlook*, Vol. XII, October 1964, pp. 65-66.

Acceptance of the Public Health Nursing Practitioner

One of the difficulties that has been and will be met with expanding the role of the public health nurse is that of gaining the confidence of the people being served, and being accepted as a medical practitioner with new responsibilities and capabilities. It is felt that with a proper education of the public as to the role and qualifications of the public health nursing practitioner, and with the support of physicians and community health services, this will be achieved without too much trouble. The problem will be resolved, of course, as successful experience increases.

Matters will be made easier by the nature of the population with which we propose the nursing practitioner should work. Rural areas are characterized by

⁴⁷M. I. Barter, "The Pilot Home Care Program of Toronto", *Canadian Journal of Public Health*, Vol. LIV, February 1963, pp. 65-62.

⁴⁸E. O. Quigley and L. R. Warner, "Measuring Patient Progress", *Nursing Outlook*, Vol. XII, October 1964, pp. 65-66.

lower income and educational classes which now have inadequate service. In this group, the nurse could through her own health education activities partially create her own demand, while higher income members of the community can still have the opportunity to purchase physicians' services if they desire. Aside from this, poorer families are more likely to use the nursing practitioner, as she is able to build rapport with residents more easily than the distant or busy physician. D. M. Connor quotes Friedson in writing that "the lower the social class, the stronger seemed the feeling that the nurse was a kind of substitute physician".⁴⁹ In general, there is good potential for the acceptance of the nursing practitioner. The Berkeley experiment failed to show evidence of non-acceptance by families and the Le Mat study of indigent New York women indicated an appreciation of the nurse's services. G. A. Silver has written an evaluation of the Family Health Maintenance Demonstration,⁵⁰ which used staff nurses of the Montefiori Clinic to supplement the services of physicians in the particular areas of counselling, health evaluation and medical treatment. Silver found that "the nurse achieved the medical-care status of a substitute or surrogate for the doctor in his absence or by his designation".⁵¹ This was partially because patients saw the public health nurse as a "doing" and hence a "good" person. In relation to physicians' services, there was a positive correlation between the use of her services with the lowness of the income class (see Table 9.25).

TABLE 9.25
Family Health Maintenance Demonstration Study, Families' Annual Average Utilization of Services by Social Class of the Father

Social Class	Staff Members	
	Family Physician or Paediatrician	Public Health Nurse
Upper-Middle	18.6	10.5
Middle	19.7	12.2
Lower	16.5	11.7
Total	18.1	11.9

SOURCE: G. A. Silver, *Family Medical Care — A Report on the Family Health Maintenance Demonstration*, Harvard University Press, Cambridge, Mass., 1963, p. 143.

Perhaps the more difficult task is gaining the cooperation and approval of physicians. This would have to be overcome by educating them as to the need and nature of the nursing practitioner's work. It is essential that they realize the new personnel do not threaten the security of their practice, but are created to help the physicians provide adequate medical care to the whole population. The nursing

⁴⁹D. M. Connor, *op. cit.*, p. 127.

⁵⁰G. A. Silver, *Family Medical Care — A Report on the Family Health Maintenance Demonstration*, Harvard University Press, Cambridge, Mass., 1963.

⁵¹*Ibid.*, p. 93.

practitioner would take over routine tasks only, and would leave the doctors free to concentrate on more challenging work. In addition, physicians should come to realize that the nursing practitioner works primarily with low income families who often do not or cannot afford to receive professional care. Through her preventive and educative routines, the nursing practitioner will undoubtedly increase the number of problematic and interesting cases being presented for care under physicians.

Education of the Public Health Nursing Practitioner

It is not within the scope of our study to suggest the educational program required. It has been recommended that public health nurses should have a good background in core medical courses, some exposure to the nursing aspect, and some multidiscipline studies such as community organization, the behavioural sciences, and the humanities. The present structure of public health nurse training is either a one-year certificate course following a hospital school diploma, or a university degree. The former type of program generally is considered inadequate for the "professional" nurse. However, a large proportion of those currently employed have only this training. Many university programs are five years in length, with only the first and last controlled by the university. The three intervening years are spent in a hospital school. The final year is one of specialization in public health nursing, nursing education, or nursing administration. The soundness and value of such a program is questioned by Mussallem,⁵² who feels that the entire course should be the responsibility of the university. This was supported by the University of Toronto nursing school in its Brief to the Hall Commission.⁵³

The period of time spent in hospital nursing training should be reduced, and could result in a four-year course. The general opinion is that such a course is necessary for professional public health nurses. It is probable that an even more intensive Bachelor of Nursing Science degree, a year of postgraduate training, and a period of in-service training could best prepare the public health nursing practitioner for her duties. This should be seen in the perspective of the seven years and internship of the general physician.

Cost of Training

Aside from the ability of such middle echelon medical personnel to perform the task proposed, it is necessary to determine whether such a program is economically feasible and could provide a financial saving to society. Mussallem estimated that the cost of educating one nursing student was \$2,000-\$2,800 per year, and that

⁵²H. K. Mussallem, *Nursing Education in Canada*, Royal Commission on Health Services, Queen's Printer, Ottawa, 1964.

⁵³University of Toronto, School of Nursing, Brief to the Royal Commission on Health Services, Toronto, 1962, pp. 8-13.

the cost of a university year was comparable.⁵⁴ The figure of \$2,400 is comparable with the *a priori* suggestion that university nursing education has about the same cost as that for other science students. The Bladen Commission gave a figure of \$3,219 per student in 1964-1965 and an annual cost increase trend of about 4 per cent per year. Presuming that the Mussallem figure is for 1961-1962, Bladen's figures compare to her upper cost estimate. On the basis of Bladen's data, the cost of training a nursing practitioner by a five-year program for 1971 would be approximately \$17,880. We estimate opportunity cost at about \$13,000 for the five-year period.

The problem now arises as to how many such nursing practitioners would be required for the rural areas of Ontario. This question depends on the technical and professional question of the optimum or even minimum ratio of our nursing practitioners to physicians. The ratio would be determined by the amount of work she could take from the physician, and hence on her qualifications. (This is assuming that physicians would pass on to the nursing practitioner those cases which she could handle.) We do not know this ratio, but a reasonable minimum figure might be that a nursing practitioner could do half the services of the rural general practitioner. Accordingly, as the costs of training and the costs of maintaining a nursing practitioner are less than half those associated with training and maintaining a general practitioner, the rural health care program involving the newly trained nursing practitioner seems clearly more efficient than one using physicians alone.

Conclusion

In conclusion, this alternate program for providing adequate medical services does not sacrifice, but would probably improve, the quality of medical care over that which would be provided by training the additional number of general practitioners. It would undoubtedly be an improvement over the situation in which no care is provided. The provision of medical care in rural areas by the training and employment of public health nursing practitioners seems justified. We might also suggest that such a health care professional could probably find a significant role on the health care team that serves low income urban communities.

⁵⁴H. K. Mussallem, *op. cit.*, p. 132.

Chapter 10 Conclusions

Our conclusions fall into two broad categories. First, there are those that would be relevant to the situation in which one could adjust all of society's institutions; second, there are those that are relevant to the situation in which only the institutional framework of the health sector can be adjusted.

Utopia

In the first set of circumstances, those in which Utopia could be approximated, one economist probably would conclude that there is not a case for compulsory licensure of health care personnel. He might also conclude, however, that there was a reasonable case to be made for the setting up of a non-compulsory certification board.¹ (Such a board would be controlled, operated, and financed by the government.) This conclusion is based on the notion that information about health goods and services and health care personnel is very difficult to obtain on an individual basis, and that there are external economies of production associated with the provision of this information.

The argument that there are segments of the population who would ignore the information provided by such a government certification board or be ignorant as to its use and, further, who should therefore be protected from uncertified personnel probably yields the conclusion that a government should use certified or uncertified health care personnel to provide direct health care to those segments at little or no charge. This argument might also yield the conclusion that compulsory licensure is justified (but see Chapter 5).

Adjustment of the Institutional Framework

The second set of circumstances seems to involve two subcategories. First, on the assumption that the institutional framework of the health sector (including the power of professional associations) can be modeled in any prescribed way, the conclusions presented above are all applicable. They must be modified, however, by consideration of the changes in the distribution of personal income that would result from the readjustment of the institutional framework. In other words, if physicians and dentists are presently receiving monopoly profits as a result of restricted entry to their occupations, the changes suggested would result in the loss

¹It would probably require annual renewal of certification and recertification every five years following the successful completion of a set of examinations.

of income by physicians on average and in the gain of income by consumers of health care.

On the assumption that certain institutions in the health sector cannot be changed or can be changed only with difficulty, the appropriate conclusion is that some compulsory licensing procedures are justified. (This is a typical second-best conclusion; see Chapter 5.) If such procedures are thought to be required, then the aim must be to make them as useful as possible for the efficient allocation of resources within the health sector.

Overall Flexibility of Licensing Procedures

Towards this end it seems reasonable to conclude that such procedures should be more flexible than they now are.² For example, in the hospital setting or in the group practice or clinic setting, physicians and lay administrators in consort should be able to train personnel or to use previously trained personnel in ways that seem best to bring duties and capabilities into correspondence. If a nurse can be trained to perform a particular health care activity as efficiently as a physician, then she should not be prevented by law from doing it in the above settings.

Apparent Inadequacies of Existing Institutional Framework of Licensing Procedures

As we noted earlier, the existing institutional framework of licensing procedures is likely to be optimal only by chance in a world characterized by monopoly power and government participation in production activities. It is from this point that we proceeded to examine the existing institutional framework with regard to the provision of dental care; of prenatal, delivery and confinement, and postnatal care; and of rural family health care. In particular, with respect to the health care personnel who provide each of these three categories of health care, we asked the questions about specialization and optimal resource use posed in Chapter 5.

Our general conclusion is that the existing institutional framework of licensing procedures is not optimal. This is based on the detailed studies presented in Chapters 7, 8 and 9. In the first of these, we examined the use of dentists versus dental health nurses, for the provision of dental care to school-aged children. Our procedure was to describe in detail the care that was required and to relate this to the assumed capabilities of the dental health nurse and dentist. It appears that the dentist is overtrained for many of the dental care services that are and would be provided to children, and that the dental health nurse or junior dentist (after

²Again, they should probably involve annual renewal of the licence to provide health care and relicensing every five years, again after the successful completion of a set of examinations. This conclusion seems to follow directly from the results of recent studies of general practice which indicated the probable existence of inverse relationships between quality of care provided and the age of the physician. See K. F. Clute, *op. cit.*

two years of training in the provision of dental care to children) would represent a more rational use of society's scarce health manpower.

The provision of obstetrical care was examined in Chapter 8. Again we were concerned with the use of two types of health care personnel — namely, the obstetrician and the midwife. We set out in detail the obstetrical care that is commonly thought necessary and adequate for normal pregnancies. We then attempted to relate the several aspects of this care to the assumed capabilities of the midwife and the specialist obstetrician. Unquestionably, the latter is overtrained for providing many parts of obstetrical care. The former appears to be more suitably trained; that is, her training seems more in line with many of the tasks of obstetrical care. Our conclusion here was that a team of midwives and obstetricians would represent a much more efficient use of scarce resources than the present combination of general practitioners, obstetricians, and nurses and nursing assistants who happen to be on duty when the pregnant mother arrives at the hospital.

Finally, in Chapter 9 we presented a detailed examination of the health care requirements of rural inhabitants in relation to the types of health care personnel that might provide this care. In this case, it appears that the general practitioner is somewhat overtrained for the job because of the vast amounts of his time that necessarily would be involved in travelling rather than in providing health care. It is thought that a public health nurse, feldscher (or junior physician), or public health nursing practitioner, with three or four years' training in the provision of medical care, would represent a more efficient use of society's scarce resources.

These conclusions are held even more firmly when consideration is given to the expected introduction of a universal medical care plan; for there are vast sections of the population who receive little or no care of the kinds discussed in Chapters 7, 8 and 9. Accordingly, if the government is serious in its desire to provide medical care to all individuals, then it must increase the existing supply of health care resources in a manner that ensures that the nature and structural organization of health care resources is as close to optimal as is possible.

Acceptance of New Personnel

Data presented in Chapter 9 on the acceptance of different types of health care personnel (other than physicians and dentists) in several real-life studies suggest that there is little or no problem of acceptance. The reported acceptance of the dental health nurse in New Zealand further supports this claim.

We must be clear, however, which groups in the population we are considering. If we are concerned with the dental care of school-aged children who do not now receive care or who receive care that commonly is recognized as inadequate, then we would not expect to be confronted with a problem of acceptance on the part of these children and their parents. On the other hand, if we are considering the

acceptance of dental health nurses by persons in the middle and upper income classes who now purchase dental care from a dentist, we might not expect immediate and overwhelming acceptance of the dental health nurse.

In the same manner, if we consider the large groups of rural inhabitants and low income urban dwellers who presently receive little or no prenatal, well-baby and child health care, then we would not expect to find a problem of acceptance of the public health nursing practitioner. We would, however, if we considered the middle and upper income population who now purchase these types of care from physicians.

Finally, attention should be paid to the fact that individuals presently purchase an extremely wide range of health goods and services from an extremely wide range of personnel, some specifically trained in the provision of health care and some not. Analyzing data from several studies done in Great Britain and various parts of the United States, Kerr White presented the following results of the patterns through which a population of 1,000 adults over sixteen years sought health care in a period of one month. Of the 1,000 adult individuals, 750 experienced illness or injury in the month; of these only 250 sought medical care from a physician; of these, only nine were referred to hospital and only five to another physician; finally, of the initial 750 persons demanding health care, only one entered or was referred to a teaching hospital.

In other words, of the 750 adult individuals demanding health care, some 500 will seek it from someone other than a physician — that is, from a pharmacist, nurse, faith healer, religious practitioner, and so on. There would thus seem little reason to expect any problems of acceptance of a junior physician, junior dentist or midwife from potential and present consumers of health care.

Training of Female versus Male Personnel

It is often alleged that the training and education of females is not worthwhile because their working life is expected to be shorter than that of males. There seem to be two points that are not commonly considered in evaluating this argument. First, males normally dominate the medical professions and seem to delegate to females jobs that require less responsibility and competence than their training would justify. It seems all too easy to understand the lack of interest of the dental hygienist who has been trained as a junior dentist but who in practice is employed as combination receptionist, typist, janitor and accountant. Similarly, a nurse with three to five years of training in providing medical care who is given the job of distributing and collecting food trays, bed pans, and/or dirty linen may be expected to have less interest in nursing as a career than would be the case if she were given responsibilities that correspond to her training. Thus the appropriate attrition rates to look at are those describing the working life of female health personnel in countries where there is a rational allocation of personnel to

duties that correspond to acquired skills. The low attrition rate of the dental health nurse in New Zealand seems to substantiate this claim.³

The second point relates to the real social cost of training females for the different health care occupations. In that the training of female health personnel involves a reduction in the number of male personnel that can be trained with the given stock of educational facilities, it is necessary to estimate the net social returns to the education of male and of female.

This would involve consideration of the estimated working life of each, the social return in excess of the private return associated with the actively working male and female physician, and the social costs of educating each.

On the assumptions that the costs of educating male and female are the same, that social return above private return associated with the actively working physician are the same for male and female, that the working life of females is shorter than that of males, and further that the number of high quality applicants is sufficient to fill the number of available medical school places, the training of female physicians, for example, would be particularly difficult to justify on economic grounds.

If, on the other hand, there are female applicants who are more highly qualified than male applicants, then the difference in the quality of applicant must be balanced off against the difference in the length of working life. It is highly probable that some female applicants are sufficiently more highly qualified than some of their male counterparts as to justify the training of females in spite of the fact that their working life may be shorter.

A similar calculus must be carried out to determine the advantage of training female midwives or female dental health nurses at the cost of reducing the number of male physicians or male dentists trained, respectively.

The assumption about costs implied in the above discussion — that the training of female personnel involves a reduction in the number of males trained — is probably not realistic, however. Our society has undertaken the task of providing higher education to all persons who satisfactorily complete high school. The real social costs of training female health personnel thus can be measured appropriately by the number of female university graduates who are not educated (but who, however, would have been). That is, increasing the number of female health personnel trained probably involves no more social cost than the cost to society of fewer female arts and science university graduates. Though this may be a minimum estimate, it is clear that the real opportunity cost of training these female personnel is not even close to the amount indicated by the cost of their educational program. Just what the real opportunity cost will be depends on the costs (in terms of education facilities and personnel) of training females in the two pro-

³See Chapter 7.

grams and the social return over private return associated with the working female health personnel (however short her working life) and with the female university graduate. Though direct education costs may be greater for the former,⁴ social return above private return also is probably greater. It thus seems likely that the training of female personnel can be justified in terms of net social benefits (social returns minus social costs), if indeed the training of male personnel and female university graduates can be justified.⁵

Introduction of a National Medical Care Plan

Our final set of conclusions relates to other ramifications of the proposed national medical care scheme. First, we expect the same rationing problem as was discussed with respect to hospital insurance in Chapter 5. Given a zero or nominal direct charge for health goods and services, quantity demanded will exceed quantity supplied. Resources thus will have to be allocated to the task of rationing the inadequate supplies (which by definition will always be inadequate at a zero or nominal price). Accordingly, if additional resources are not allocated to the health sector, the quantity and quality of health care provided will fall as some health care resources perform the rationing job rather than direct health care activities. If additional resources are allocated to the health sector, expenditures for the provision of a given level of health care will rise (as above). In that society will attempt to satisfy at least part of the increased quantity of health care demanded, demand for the services of the existing stock of health care personnel may be expected to rise. This will raise the price of their services and as a result costs of a given unit of health care may be expected to rise further.

Second, with regard to the availability of health care to all Canadians, it must be emphasized that health care resources (both human and non-human) are not equally distributed throughout the country or throughout a given province such as Ontario. This implies that large segments of the population are receiving little or no health care. As the existing stock of health care resources appears to be fully employed (and some would argue overemployed), these segments of the population will not receive health care under the national medical care plan unless the available stock of health care resources is redistributed — that is, unless *less* health care is provided to middle and upper income, social and educational classes and to urban communities, and *more* care is provided to low income, social

⁴These costs have been estimated as equal; see H. K. Mussallem, *op. cit.*, pp. 37-45, 85-86, 132-133.

⁵In practice, it is difficult to justify on grounds of economic efficiency the provision by governments of most types of education beyond high school. With respect to the medical professions, the large income streams that accrue to a person are more than adequate to repay any loans taken to pay for medical training. The largest degree of government subsidy that can perhaps be justified on economic grounds is a government loan scheme for students (loans made at the market rate of interest and repayable after graduation).

and educational classes and to rural areas through a redistribution of existing health care resources.

Furthermore, a medical care plan which involves financial coverage only (either through direct payment or reimbursement) cannot be expected to accomplish this redistribution of health care resources. In practice, such a financial medical care plan can be expected to benefit only those persons who now purchase medical care.⁶ Such persons presumably now have a family physician who by all accounts is virtually overworked and thus who is unlikely either to take on additional patients or to drop old ones in order to take on new ones.

The government is thus in the position of having to educate and train health care personnel for the provision of health care to persons who do not now receive care or who receive inadequate care.⁷ In this task, commonsense demands that the training of personnel should correspond as closely as possible to the health care to be provided. Our conclusion about the introduction of the junior dentist (dental health nurse), midwife and junior physician (public health nursing practitioner) thus gains greater significance. Such personnel represent providers of health care that is not now being provided but which the government claims will be provided under the national medical care plan.

We might again note the enormous decision-making tasks facing a government that undertakes to provide health care; for this is just what a government does when it introduces hospital and medical insurance. It must decide which goods and services are health goods and services and at which price they should be reimbursed or paid for. In short, a government is now responsible for the entire solution to the economic problem of providing health care that is outlined in the earlier chapters of this study.

Finally, with regard to the institutional framework of licensing procedures, it is possible to conceive of the government using any one of a number of such frameworks, including that of non-compulsory certification boards.⁸ The more likely situation, however, is that characterized by some compulsory licensing procedures. Accordingly, our conclusions are that such procedures should be as flexible as possible, especially in the hospital and in group practice or clinic settings; that they be under continuing analysis in order to effect improvements in the structural organization of health care resources and to introduce such changes in this structure as are suggested by changes in medical technology; and,

⁶This is especially so if the medical care scheme is financed from taxes whose distribution effects are neutral or regressive (for example, sales taxes).

⁷One wonders why a national medical care scheme of a financial nature only is being introduced. If one is really concerned with providing care to these persons, why not follow the example of the Scandinavians and provide direct care, or at least redistribute health care resources to selected areas?

⁸The government would then levy a negative ad valorem sales tax of 100 per cent on the purchase of health care, whether provided by certified or non-certified personnel.

specifically, that junior dentists (dental health nurses), midwives and junior physicians (public health nursing practitioners) be introduced as personnel trained to provide health care (medical and dental care).

This last set of conclusions is especially important if the government takes seriously its attempt to provide health care of a given minimum standard (yet to be defined) to all Canadians regardless of their income, social or educational class and regardless of habitat (rural or urban).

We might offer a final thought. The institutional framework of licensing procedures, and accompanying regulations and educational requirements, is the form through which a society attempts to carry out its responsibility to its individual citizens. Therefore a society should keep this framework of licensing procedures under continual scrutiny and analysis, even though it may have delegated this responsibility of licensing to some body. This constant scrutiny is essential in our world of rapid advances in medical technology, and changes must be made in the nature of health care resources if such advances are to be exploited fully.

Appendix I

Health Care Resources

Physicians and Surgeons

This section is divided into four subsections. First, data submitted by the College of Physicians and Surgeons of Ontario are presented. Contained in these data is information regarding the register of members, their origins, numbers on the special register, and so on. Second, we present limited information submitted by the Ontario Medical Association. Next, we include the Preliminary Results of CMA and Provincial Licensing Authority Survey of Canadian Medical Manpower of 1967. This survey contains an excellent breakdown of Canadian data. The CMA feels that the results of this survey are applicable to the whole of Ontario with very little loss of accuracy. We did not include data from the Hall Commission Report since the CMA survey gives the same type of information and is up to date. Finally, we present data from *Hospital Statistics*.

The College of Physicians and Surgeons of Ontario

In 1968 the total number of registrants in the College of Physicians and Surgeons of Ontario was 10,631. In 1967 the number was 10,236, and 1966 it was 10,012. In addition to those holding regular licences, there are those in the "special" or Temporary Register, and those in the Educational Register. The latter group are internes. The existence of the special or Temporary Register since 1960 has made it possible for the Council of the organization to grant limited licences to 609 physicians to whom full registration otherwise would not be available. (In 1966 there were 350 doctors on the Temporary Register.)

TABLE A1**Registrations on the Special Register, College of Physicians and Surgeons of Ontario, January 1, 1960 to December 31, 1968**

	Graduates of Canadian medical schools	Academic appoint- ments	Temporary employ- ment	Armed forces or public service	Proba- tionary	Special cases	Total
1960	—	—	—	11	—	—	11
1961	—	—	7	6	1	1	15
1962	—	4	23	36	3	5	71
1963	—	4	48	26	3	11	92
1964	8	5	69	45	4	13	144
1965	4	13	121	59	6	25	228
1966	—	15	236	55	6	38	350
1967	21	26	295	67	8	73	490
1968	27	44	406	94	7	96	674

SOURCE: College of Physicians and Surgeons of Ontario, Brief to the Committee on the Healing Arts; and *Report*, January 1969 (annual).

Of the 1,950 graduates of Ontario's three medical schools, 70 per cent are still registered in Ontario, 20 per cent are in other provinces, and 10 per cent have left Canada.

TABLE A2**Registrations in the College of Physicians and Surgeons of Ontario by Location of Universities where Medical Degrees Were Obtained, 1951-1968**

	Graduates from Canadian universities	Graduates from U.K., Australia, N.Z., S.A.	Graduates from universities in U.S.A.	Graduates from foreign medical schools	Licensed without having sat M.C.C. examinations	Total
1951	305	20	1	43	—	369
1952	297	29	3	52	—	381
1953	335	51	2	70	2	460
1954	304	67	7	86	—	464
1955	344	55	4	99	—	502
1956	343	88	2	88	1	522
1957	307	125	3	70	—	505
1958	221	118	3	82	—	424
1959	224	91	3	98	—	416
1960	266	59	5	71	—	401
1961	291	48	10	55	—	404
1962	293	48	6	47	—	394
1963	300	55	2	28	—	385
1964	335	52	—	25	—	412
1965	307	49	2	27	—	385
1966	320	91	3	26	—	440
1967	393	132	7	33	—	565
1968	394	148	4	66	—	612

SOURCE: See Table A1.

TABLE A3

Annual Registrations in the College of Physicians and Surgeons of Ontario by Source of Medical Education, for General Practitioners and Specialists, 1964-1968

	Ontario		Other provinces		U.K. and Ireland		Aust., N.Z., S.A., and U.S.A.		Other countries		Total
	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	
1964	249	23	51	12	35	14	1	2	18	7	412
1965	224	5	68	11	42	5	3	—	17	10	385
1966	219	8	80	13	72	9	9	4	16	10	440
1967	274	11	84	24	99	15	24	1	16	17	565
1968	268	10	94	22	115	12	23	2	24	42	612

SOURCE: See Table A1.

TABLE A4

Annual Erasures from the Register of the College of Physicians and Surgeons of Ontario, 1964-1968

	Retirement		In Ontario		Out of Ontario		For dues		For cause		Total
	Death										
	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	G.P.	Spec.	
1964	83	30	32	11	120	58	16	3	4	2	366
1965	43	24	43	13	64	22	106	33	—	—	348
1966	48	38	11	3	9	5	—	—	5	—	119
1967	51	40	25	13	61	39	108	32	2	1	372
1968	59	37	22	14	80	39	29	16	—	—	296

SOURCE: See Table A1.

The College feels that a word of caution is called for in regard to the use of Tables A2, A3, and A4 in surveying the medical manpower resources of Ontario. The data have not been compiled for such a purpose and, thus, some conclusions derived from them might be quite misleading. The figures have been distorted to a degree by a change from an annual to a biennial fee system that became effective January 1, 1965. This and "a number of other factors" (which are not mentioned) make it doubtful that wholly valid conclusions may be drawn from the statistics (according to the College).

An annual survey of internes has been carried out by the College since 1959. These surveys have shown an increase from 938 in 1959 to 1,525 in 1968. In 1965 an amendment to the Public Hospitals Act stipulated that hospitals could employ only internes who were registered under the Medical Act. The survey in 1966 showed that more than 95 per cent of the province's internes were registered and "it would be fair to say that the others were in the course of being registered".¹

¹College of Physicians and Surgeons of Ontario, Brief to the Committee on the Healing Arts, Part I, p. 14.

TABLE A5
Foreign Medical Graduates by Origin of Degree Who Are Members of the
College of Physicians and Surgeons of Ontario, 1930-1966

Country in which degree was obtained	Year of registration															
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
Australia											1					
Austria		1										2	1		1	
Belgium																
Bulgaria																
China												1				
Cuba																
Czechoslovakia										1		4			1	
Denmark																
Egypt																
Estonia																
Finland																
France									1	1						
Germany									1							
Greece																
Haiti																
Hong Kong																
Hungary	1															
India																
Iraq																
Israel																
Italy															1	
Korea																
Latvia																
Lebanon																
Lithuania																
Malta																
Mexico																
Netherlands																
New Zealand																
Pakistan																
Philippines																
Poland															1	
Portugal																
Russia																
Romania																
South Africa																
South America														1		
Spain																
Sweden																
Switzerland							1						1			
Turkey																
Ukraine																
United Kingdom				1	1		1	3	1	1	1	3	2	1		
United States		1						1	1	1			1	1	2	
West Indies																
Yugoslavia																
Total FMG's registered per year	1	1	1	1	1	2	4	2	4	3	4	8	4	3	6	
Total FMG's on Register per year	99	114	142	154	182	166	159	185	179	250	200	201	214	267	208	

SOURCE: College of Physicians and Surgeons of Ontario, Brief to the Committee on the Healing Arts, Part I, Appendix, p. 9.

Between the years 1930 and 1939, 1,630 graduates from Canada, the U.S. and the United Kingdom were registered by the college. Only twenty-three applications were received from graduates of schools from countries other than these three. Six of these were registered; seventeen could not produce adequate credentials. Since 1941 there has been a steady increase in registrants from other European countries; most of these physicians are refugees. In 1955, sixty-six graduates from these European schools got Enabling Certificates, and ninety-five foreign graduates were registered. Eighty-eight of these registrants were from European schools and seven were from schools in Asia.

Between the years 1953 and 1963, the College granted Enabling Certificates to 482 graduates of foreign medical schools (excluding schools in U.S.A., U.K., Australia, New Zealand, and South Africa). Of these, 430 passed the M.C.C. Examinations, 417 were licensed by the College, and 375 were practising in Ontario on November 30, 1964. The geographic distribution of the 375 practising was as follows:

- 199 (53.0 per cent) Metropolitan Toronto
- 59 (15.7 per cent) 4 communities, population over 100,000
- 33 (8.8 per cent) 5 communities, 50,000–100,000
- 23 (6.1 per cent) 7 communities, 25,000–50,000
- 5 (1.3 per cent) 2 communities, 5,000–25,000
- 56² (15.0 per cent) communities under 5,000.

There has long been a problem about physicians from India. On October 3, 1966, the College Register showed sixteen Indian physicians residing in Ontario

TABLE A6
Number of Cases Deal¹ with by the College of Physicians and Surgeons of Ontario, Discipline Committee, 1956-1966

Year	Number of cases
1956	3
1957	—
1958	1
1959	—
1960	1
1961	6
1962	6
1963	10
1964	14
1965	13
1966	15

SOURCE: College of Physicians and Surgeons of Ontario, Brief to the Committee on the Healing Arts, Part I, p. 30.

²Six of these are located in three such communities, and comprise 85 per cent of the practitioners in these areas.

and fully licensed, six listed on the Special Register, and sixty-six employed as internes in hospitals in Ontario and on the Educational Register.

Other figures kept by the College deal with disciplinary matters. Until 1960 a physician could be removed from the register only for "infamous and disgraceful conduct". In 1960, the word "improper" was added to this list. In 1963, the condition of misconduct under the Drug Act was included, and in 1965, "incompetence" was cause enough.

The Ontario Medical Association

TABLE A7
Physicians Licensed¹ and Resident in Ontario, 1930-1968

Population ²		Physicians		Physicians per population
1931	3,432,000	1930	3,943	1 per 870
1941	3,788,000	1940	4,122	
1951	4,598,000	1950	5,523	
1961	6,236,000	1960	8,028	
1965	6,788,000	1965	8,739	1 per 767
1968	7,306,000	1968	9,530 ³	

¹Licensed by the College of Physicians and Surgeons of Ontario.

²Population figures are from DBS except for the 1965 figure, which is from the Government of Ontario.

³Estimate given by the College of Physicians and Surgeons of Ontario.

SOURCE: Ontario Medical Association, Brief to the Committee on the Healing Arts.

In 1966, 7,798 physicians were members of the Ontario Medical Association. This represented 76 per cent of the doctors in Ontario. The Association has sixty-one territorial divisions and eleven district associations.

Some indication of the rapid increase in the number and variety of medical services available in Ontario is seen in the Association's schedule of fees. In 1946 there were 600 items on this schedule; in 1966 there were 2,000 items.

The Association feels almost everyone in the province is able to get good medical care. They claim, for instance, that most parts of the province have, in varying degrees, the availability of a radiologist's services, through the mail, and so on. They make the same claim for ophthalmologists. In 1961 when the population was 6,236,000, there were 154 in Ontario. (This means there was one ophthalmologist for every 40,494 people. The Association computes this as one per 31,698.) In 1966 there were 250 ophthalmologists, making the ratio one per 26,000 people. The Association regards this figure as adequate for the following reasons.

Statistics derived from sources such as the Federal Department of Health and Welfare (family allowance payments) indicate a high degree of mobility on the part of families today, both within Ontario itself and from province to province generally. Again, expenditures on automobiles and highway construction have been increased astonishingly. Travel by air is commonplace Methods of communication have also kept pace with this physical mobility. The telegraph and telephone have been augmented by radio and television network services, by the teletype and wire services on which printed communications depend. In a phrase: geography is no longer a barrier In the light of the foregoing, it is estimated that 90 per cent of the people of Ontario are served directly, or reasonably directly, by the province's ophthalmologists. The remaining 10 per cent are not as well served in terms of day-to-day medical eye care. However, it must be emphasized that, in view of and because of the population factors outlined above, citizens of remote areas may be put in touch with ophthalmological services literally within hours in the event of emergencies. Again, such citizens have reasonable recourse to general medical services. As noted earlier, for many aspects of eye care, every family physician is also an eye doctor.³

The Association says further that 30 to 40 per cent of initial prescriptions are made directly by optometrists.

In 1966, the Ontario Medical Association sent a questionnaire to every physician in the province to determine how he obtained new patients. The OMA received 5,046 replies. Fifty-four per cent saw patients who had not been referred by other doctors; 20.4 per cent more were available to see referred patients; 7.5 per cent did work that did not involve patient care; and the remainder were in institutions or in public health work. In the northern and rural parts of the province, 66.4 to 74.5 per cent of the physicians were seeing patients without referral. The figure for Metropolitan Toronto was 44.2 per cent.

TABLE A8
Time Taken for a Kidney Transplant in Ontario

	Physician	Hours of care Nursing	Lab.
<i>A. Pretransplantation Period</i>			
Initial evaluation hemodialysis (3 weeks)	6	74	5
Hemodialysis 2x weekly (12 weeks)	12	240	24
<i>B. Transplantation Period</i>			
Surgery (4 weeks)	40 ¹	10	—
Initial postoperative (3 weeks)	21	404	10
Further in-hospital care (8 weeks)	18	222	15
Total	97	950	54

¹Includes surgical component of postoperative care.

SOURCE: Ontario Medical Association, Brief to the Committee on the Healing Arts.

³Ontario Medical Association, Brief to the Committee on the Healing Arts, p. 109.

To indicate time spent in performing medical operations, the Association presents several time studies. Figures for one of these, the kidney transplant, are given in Table A8.

Canadian Medical Association

The following series of tables (Table A9 to A25) are the preliminary results of the CMA and Provincial Licensing Authorities Survey of Canadian Medical Manpower, 1967.

The initial tabulation of the results from the first mailing of the questionnaire on medical manpower is based on 8,323 returns of doctors who are not undergoing any major phase of training. Internes and residents were excluded, therefore, from this first tabulation. The number of returns from the first mailing is now well over 10,000, but a cut off point had to be instituted at an earlier date in order to permit preliminary tabulations to proceed. Returns from doctors in the community now exceed 66 per cent from the first mailing. A second mailing has since been sent out to those who had not replied.

When returns as close to 100 per cent as possible have been received, further more extensive tabulations can be made. The results reproduced here are simply preliminary results in some of the key areas of interest.

TABLE A9
Percentage Distribution of Type of Doctor by Size of Community,
Canada, 1967

Type of doctor	Size of community					Over 100,000	
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central ¹	Suburban
All doctors							
Male	6.8	7.2	5.2	8.1	21.1	44.2	8.9
Female	5.7	3.9	2.2	6.3	20.6	51.4	10.9
G.P.'s							
Male	14.7	15.0	9.0	9.9	16.7	23.3	12.8
Female	10.4	8.9	5.2	8.1	17.8	29.6	20.7
Specialists							
Male	0.7	2.2	2.8	7.0	24.8	58.5	5.8
Female	1.9	0.5	0.5	3.7	22.0	68.2	5.1
Total	6.6	7.1	5.1	7.9	21.2	44.8	8.9

SOURCE: See text of Vol. 2, pages 18-19.

The heaviest concentration of "All Doctors" is in the central areas of cities of over 100,000. Among the G.P.'s, however, it will be noted that about 30 per cent are in towns of under 5,000, while specialists make up less than 3 per cent in

those areas. About one quarter of specialists are in cities of 25,000-100,000 and 58.5 per cent (male) in central areas of cities of over 100,000. The relative number of females to males (not shown here) is G.P.'s, 5.2 per cent; specialists, 5.6 per cent. Distribution of females approximately parallels that of males.

TABLE A10

**Percentage Distribution of All Doctors by Age and by Size of Community,
Canada, 1967**

All doctors by age	Size of community					Over 100,000	
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central	Suburban
25-34	10.1	12.2	6.4	8.3	20.6	31.4	12.3
35-44	5.7	5.6	5.0	7.8	21.8	44.2	11.1
45-54	5.7	6.5	4.3	7.3	21.6	48.6	8.2
55-64	6.8	6.0	5.0	8.9	20.5	50.4	4.4
65-69	5.9	7.7	3.8	9.4	17.8	51.0	4.2
70 plus	10.9	8.3	7.0	7.0	16.6	49.0	3.6

SOURCE: See Table A9.

There does not appear to be any marked weighting of particular age groups of doctors to be found in different sized communities.

TABLE A11

**Percentage Distribution of General Practitioners by Age and by Size of
Community, Canada, 1967**

G.P.'s by age	Size of community					Over 100,000	
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central	Suburban
25-34	14.2	19.0	8.4	9.8	17.2	16.2	15.6
35-44	13.3	13.2	8.7	10.1	16.8	20.5	18.4
45-54	14.9	14.0	9.0	9.0	18.7	24.6	11.3
55-64	15.9	13.4	8.0	9.1	15.3	35.2	5.1
65-69	11.3	12.3	8.5	12.3	17.0	34.9	3.8
70 plus	16.7	14.3	10.3	7.1	11.9	37.3	5.6

SOURCE: See Table A9.

Among G.P.'s there appears to be the greatest concentration of the 25-34 age group in towns of 2,000-5,000; this accounts for 19 per cent of the total in this group. The middle and senior ages appear to favour most the central areas of cities of over 100,000.

TABLE A12**Percentage Distribution of Specialists by Age and by Size of Community, Canada, 1967**

Specialists by age	Size of community					Over 100,000	
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central	Suburban
25-34	0.9	3.1	2.6	6.0	27.1	57.1	5.1
35-44	0.8	1.3	3.3	6.3	25.3	57.6	6.7
45-54	0.5	2.7	1.8	6.9	23.5	60.6	6.3
55-64	1.0	1.9	3.1	7.7	24.1	61.1	3.1
65-69	0.7	2.7	0.7	6.8	21.8	63.3	4.1
70 plus	1.8	5.5	4.5	5.5	23.6	59.1	1.8

SOURCE: See Table A9.

The favourite location for specialists of all ages is the central area of a city of over 100,000, followed by the city of 25-100,000. There is a slight tendency for the distribution of specialists to places of under 10,000 to increase with age — i.e., in those under 2,000, it went up from .9 per cent to 1.8 per cent; in those of 2,000-5,000, it went up from 3.1 per cent to 5.5 per cent; and in places of 5,000-10,000, it went up from 2.6 per cent to 4.5 per cent.

TABLE A13**Percentage Distribution of Doctors in Individual Specialties by Size of Community, Canada, 1967**

Specialty	Size of community					Over 100,000	
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central	Suburban
Allergy	2.1	2.1	4.2	2.1	25.3	60.0	6.3
Anaesthesia	0.6	2.7	3.6	4.0	24.3	57.1	7.9
Bacteriology	—	—	—	8.9	26.7	60.0	6.7
Cardiology	—	4.6	3.8	4.6	21.5	61.5	3.8
Cardiovascular surgery	—	7.1	—	2.4	9.5	78.6	2.4
Dermatology	1.3	—	1.3	2.7	28.0	65.3	5.3
Gastroenterology	—	—	1.8	7.0	19.3	66.7	5.3
General surgery	1.5	5.9	5.8	11.7	28.4	43.6	5.4
Gynaecology	0.7	1.7	3.2	6.8	28.1	54.8	5.6
Haematology	—	1.2	2.5	9.9	19.8	60.5	7.4
Internal medicine	0.2	2.4	2.5	4.7	22.2	65.8	3.3
Med. biochemistry	—	—	2.7	13.5	21.6	54.1	10.8
Neurology	—	1.6	—	6.3	15.9	74.6	4.8
Neurosurgery	—	4.7	2.3	—	18.6	76.7	4.7
Obstetrics	0.8	0.5	1.9	6.9	28.5	56.4	5.6
Occupational medicine	3.4	1.7	6.9	1.7	29.3	51.7	5.2
Ophthalmology	0.5	1.8	2.3	7.2	29.9	52.9	7.7
Orthopaedic surgery	0.5	3.2	3.7	8.9	24.7	57.4	4.7

TABLE A13 (Continued)
Percentage Distribution of Doctors in Individual Specialties by Size of Community, Canada, 1967

Specialty	Size of community						Over 100,000
	Up to 2,000	2-5,000	5-10,000	10-25,000	25-100,000	Central	
Otolaryngology	1.2	1.2	4.3	6.8	30.2	54.3	4.3
Pathology	—	1.0	2.0	8.4	28.7	56.4	4.0
Paediatrics	1.5	0.8	1.5	4.9	25.4	56.4	11.7
Physical medicine	—	—	2.3	4.5	13.6	70.5	9.1
Plastic surgery	—	7.0	1.8	5.3	22.8	61.4	5.3
Psychiatry	0.8	0.8	4.2	8.9	22.7	58.0	7.0
Public health	1.5	4.5	4.5	7.6	31.8	43.2	9.1
Diagnostic radiology	0.4	2.6	2.2	11.4	25.3	55.3	4.4
Therapeutic radiology	—	—	1.8	5.3	24.6	70.2	1.8
Thoracic surgery	1.6	4.8	4.8	1.6	19.0	66.7	3.2
Urology	0.6	3.2	2.6	14.2	33.5	45.2	2.6
Other	1.0	3.1	2.1	1.6	18.1	72.5	3.5

SOURCE: See Table A9.

The only specialty that has a significant percentage of doctors in places of under 2,000 is occupational medicine. This is due probably to the location of industries in some smaller places.

In the 2,000-5,000 population category, cardiovascular surgery, general surgery, neuro-surgery, plastic surgery, thoracic surgery and public health show a percentage range of approximately 5 to 7 per cent, which is above that for other specialties.

There are few significant outcroppings in towns of the 5,000-10,000 class, although nearly all specialties are represented by 2 to 5 per cent of their personnel.

In small cities of 10,000-25,000, specialties represented by 5 to 12 per cent of their personnel are bacteriology, gastroenterology, general surgery, gynaecology, haematology, medical biochemistry, neurology, obstetrics, ophthalmology, orthopaedic surgery, otolaryngology, pathology, plastic surgery, psychiatry, public health, diagnostic radiology and urology.

In cities of 25,000-100,000, the average percentage of personnel seems to be about 25 per cent, although otolaryngology, public health and urology exceed 30 per cent.

Not a single specialty has less than 50 per cent of its personnel in central areas of cities of 100,000 and over. Cardiovascular surgery, neurology, neurosurgery, physical medicine and therapeutic radiology all exceed 70 per cent in centres of this size.

There is a drastic falling off in the representation of specialties in the suburbs of large cities, with most being represented by between 5 to 10 per cent of their personnel.

TABLE A14
Percentage of Time Spent in Family Practice by All Specialists, Canada, 1967

Percentage of time category	Number of specialists	Percentage of specialists
0-9	124	3.1
10-19	112	2.8
20-29	102	2.5
30-39	46	1.1
40-49	34	.8
50-59	74	1.8
60-69	38	.9
70-79	30	.7
80-89	17	.4
90-100	27	.7
Total doing any family practice	604	15.1
Total <i>not</i> doing family practice	3,401	84.9
Total specialists	4,005	100.0

SOURCE: See Table A9.

Of specialist respondents, only 15 per cent did any family practice, only 4.5 per cent of all specialists did more than 50 per cent family practice. The survey showed that 3.1 per cent did 0.9 per cent family practice, 2.8 per cent did 10 to 19 per cent, and 2.5 per cent did 20 to 29 per cent family practice. Size of community breakdowns were not significant for these relatively small numbers.

TABLE A15
Professional Activities of All Doctors by Percentage of Time Spent in Each, Canada, 1967

Field of activity	Percentage of work time groupings										No. of doctors doing given activity to any degree
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Care of Patients											
1) Fee for Service	2.0	2.7	2.4	1.8	1.5	3.5	3.0	5.6	9.3	68.2	6,196
2) Salaried	23.8	16.5	8.5	3.7	3.6	4.3	3.5	3.5	3.7	28.8	2,600
Administration	34.4	20.4	12.0	4.9	2.8	3.3	1.1	1.8	1.9	17.5	1,621
Teaching	43.2	29.3	14.0	5.5	3.8	2.0	0.5	0.5	0.3	0.8	2,132
Research	46.4	21.8	8.5	6.1	3.1	2.8	2.1	2.1	1.7	5.2	995
Other	69.6	23.7	3.4	0.6	0.3	0.4	0.1	0.2	0.1	1.7	1,975
Total respondents											8,323 ¹

¹Because of the overlap of doctors engaged in more than one activity, the above figures do not add to the total.

SOURCE: See Table A9.

This table shows on the left the major fields or subdivisions of medical activity. The figures in the centre show the percentages of doctors (out of the total numbers

for each activity shown in the extreme right hand column) who spend a percentage of their time at that activity falling within the percentage of time groupings in the heading. For example, 68.2 per cent of 6,169 respondent doctors spend from 90 to 100 per cent of their time in fee-for-service medical care. The high percentages of time in the left-hand columns for administration, teaching and research show that most of these activities are carried out on a part-time basis.

From the foregoing figures we can derive the average percentage of time spent in each activity. When this is combined with the percentage of respondent doctors devoting themselves *in any degree* to each activity, it gives us an indication of the percentage of all available medical time which is devoted to each activity. There is an underlying assumption, however, which cannot be checked from our preliminary computer runs — that the average number of hours per week spent by doctors in each field of activity are homogeneously equal. This may be the fairest basis on which to make comparisons, but in fact doctors in fee-for-service practice may work longer daily and weekly hours than those in other fields of medical activity.

Calculations concerning the total percentage of medical time spent in each field of activity are shown in the following table.

TABLE A16
Professional Activities of General Practitioners by Percentage of Time Spent in Each, Canada, 1967

Field of activity	Percentage of work time grouping										Average percentage of all medical time spent
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Care of patients											
1) Fee for service	0.8	1.0	0.7	0.5	0.4	1.6	1.3	2.6	6.1	84.9	82.1
2) Salaried	37.2	17.0	8.0	3.0	3.1	3.9	1.4	2.1	2.3	22.1	11.5
Administration	58.2	20.4	5.7	2.1	2.1	3.2	1.1	0.4	1.1	5.7	2.2
Teaching	84.4	11.7	2.0	1.0	0.5	—	0.5	—	—	—	0.8
Research	88.4	2.7	1.8	1.8	1.8	—	—	—	0.9	2.7	0.6
Other	74.2	19.6	3.0	0.5	—	0.4	—	0.4	—	1.9	2.8
											100.0

SOURCE: See Table A9.

This table shows that almost 85 per cent of G.P.'s spend 90 to 100 per cent of their time in fee-for-service care of patients. Time spent in fee-for-service care, however, is equivalent to only 82 per cent of "all" the time spent by general practitioners. Another 11.5 per cent of "all" time is spent in salaried patient care, indicating that over 93 per cent of all general practitioners' time is spent in patient care. A large proportion of G.P.'s spend up to 9 per cent of their time in administration, teaching and research (as indicated by the left hand columns), but this works out to minimal percentages of the overall time spent, as indicated on the right.

TABLE A17
Professional Activities of Specialists by Percentage of Time
Spent in Each, Canada, 1967

Field of activity	Percentage of work time groupings										Average percentage of all medical time spent
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Care of patients											
1) Fee for service	2.8	3.8	3.9	2.9	2.3	5.4	4.2	8.2	11.7	54.8	57.8
2) Salaried	18.2	16.5	9.3	4.6	4.3	4.4	5.0	5.0	4.2	28.4	17.5
Administration	32.6	22.6	14.8	6.0	3.4	3.3	1.4	2.6	2.1	11.1	7.9
Teaching	38.1	32.2	15.4	6.3	4.2	1.9	0.5	0.4	0.3	0.6	8.2
Research	41.4	25.3	9.5	6.8	3.4	2.7	2.3	2.3	1.5	4.6	4.6
Other	67.0	25.9	4.0	0.7	0.4	0.2	0.1	0.2	0.1	1.5	4.0
											100.0

SOURCE: See Table A9.

This table shows that only 55 per cent of specialists devote themselves on a relatively full-time basis (90 to 100 per cent) to the fee-for-service care of patients. This group, together with their colleagues who spend a lesser percentage of their time in this area, account for about 58 per cent of all the time spent by specialists. Another 17.5 per cent is devoted to salaried specialist care, making a total patient care segment of about 75 per cent.

About 8 per cent of specialist time is devoted to administration, a similar amount to teaching, 4.6 per cent to research, and 4.0 per cent to other medically related activities.

TABLE A18
Indicated Percentage of All Medical Time Devoted to Each Factor
of Medical Activity, Canada, 1967

Field of activity	No. of doctors engaged in	Percentage of doctors engaged in	Average percentage of time spent	Average percentage of all medical time devoted
Care of patients				
1) free for service	6,196	74.4	87.9	65.4
2) salaried	2,600	31.2	50.8	15.8
Administration	1,621	19.5	37.0	7.2
Teaching	2,132	25.6	20.5	5.1
Research	995	12.0	26.2	3.0
Other	1,975	23.7	15.3	3.5
Total respondents	8,323			100.0

SOURCE: See Table A9.

This table shows that 65 per cent of all medical time in Canada is devoted to fee-for-service care of patients. Approximately another 15 per cent is devoted to salaried care of patients. This indicates that about 80 per cent — or four-fifths of all medical time spent in Canada — is devoted to care of service to patients.

In addition, this table shows that 7 per cent of all medical time is devoted to administration, 5 per cent is devoted to teaching, 3 per cent is devoted to research, and about 3.5 per cent is devoted to other miscellaneous medically related activities.

The conclusion to be drawn in terms of medical manpower is that the available *medical time for care of patients* is equivalent to the time of only about 80 per cent of the actual number of doctors in Canada, on the basis of this analysis of the initial response to the survey.

TABLE A19

Proportion of Medical Income Earned Compared to Proportion of Time Spent in Each Field of Medical Activity for All Doctors, Canada, 1967

Field of activity	Percentage of time spent	Percentage of income earned
Care of patients		
1) Fee for service	65.4	70.2
2) Salaried	15.8	16.8
Administration	7.2	6.8
Teaching	5.1	3.0
Research	3.0	2.0
Other	3.5	1.2
	100.0	100.0

SOURCE: See Table A9.

Certain underlying assumptions must be stated before discussing this table. First, as mentioned previously, the percentages of "time spent" assume an equal average number of daily or weekly hours spent in each field of activity; but in fact, fee-for-service practice may demand longer hours and thus may increase the percentage of all medical time indicated for that field. Second, the percentages of "income earned" in each field assume an equal degree of remuneration per time spent in each field; but in fact, fee-for-service practice can have higher rewards. Since, however, we attribute to fee-for-service neither longer hours in one column nor higher rewards in the other, these factors may tend to offset each other. A third qualification exists in the fact that the two groups of doctors from which the two sets of figures were compiled are not identical in each case — for there were more replies to the time allocation question.

Given the foregoing qualifications, the figures indicate that remuneration for fee-for-service practice is about 5 per cent greater than the percentage of time spent. It does not vary greatly in the salaried area. For administration, teaching and research, the remuneration would appear to be less for the corresponding proportion of time spent.

TABLE A20

Comparison of the Proportion of All Medical Time Devoted to Various Fields of Activity by General Practitioners, Specialists and All Doctors, Canada, 1967

Field of activity	Percentage of all work time		
	General practitioners	Specialists	All doctors
Care of patients			
1) Fee for service	82.1	57.8	65.4
2) Salaried	11.5	17.5	15.8
Administration	2.2	7.9	7.2
Teaching	0.8	8.2	5.1
Research	0.6	4.6	3.0
Other	2.8	4.0	3.5
	100.0	100.0	100.0

SOURCE: See Table A9.

It is interesting to note that general practitioners devote a much larger proportion of their total work time to fee-for-service medical practice than do specialists — there is a difference of 24.3 percentage points. Specialists devote a considerably larger proportion of their time to salaried patient care, than do general practitioners. The average for all doctors is 15.8 per cent.

It is obviously the specialists who provide the backbone of the administrative, teaching and research forces; their percentages in these areas are much higher than those for G.P.'s. Many of these factors may have been generally suspected, but it is worth showing that they can be backed up with statistics.

TABLE A21

Hours Worked in Week (Office, Home and Hospital) of All Doctors by Size of Community, Canada, 1967

Size of community	Percentage of doctors whose weekly hours fall into each grouping										Average hours worked in week
	Hours per Week										
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Under 2,000	1.5	0.6	3.0	4.3	18.8	25.6	25.8	12.2	4.1	4.3	62.3
2,000-5,000	0.8	2.0	2.5	4.9	20.7	26.0	21.7	11.5	5.9	4.1	61.9
5,000-10,000	1.2	0.3	2.7	4.1	20.1	23.1	27.2	11.8	7.4	2.1	62.8
10,000-25,000	1.5	1.8	1.1	6.9	22.4	26.0	22.4	9.3	6.2	2.5	60.6
25,000-100,000	0.9	1.7	1.7	4.6	23.4	25.2	26.1	9.6	3.8	2.9	61.0
100,000+ Central	1.1	1.3	2.0	4.8	21.9	26.9	25.2	10.6	3.7	2.5	61.0
100,000+ Suburban	1.4	0.9	2.4	4.6	18.0	22.7	30.5	11.5	4.9	3.0	62.5

SOURCE: See Table A9.

This table shows that about one-quarter of all doctors work 50-59 hours per week and approximately another quarter work 60-69 hours per week, excluding "on call" hours. These are strictly "at work" hours in the doctor's office or hospital or in the patient's home. These two high core columns are surrounded by those

who work more or less than this. About one-fifth of all doctors work 40-49 hours per week and about 10 per cent work 70-79 hours. Two to 4 per cent work up to 100 hours. The 2 to 5 per cent at the low end of the scale probably represent the retired or semi-retired doctors who are included in these figures.

In considering the average hours worked per week shown in the far right column, it is interesting to note that they hover around the sixty mark regardless of the size of the community. This is one and one-half times the length of the accepted industrial and office work week of forty hours — even when the retired doctors are included in the average.

TABLE A22**Expenses of Practice by Mode of Practice for All Doctors, Canada, 1967**

Mode of practice	Expenses of practice as a percentage of gross income Percentage of income groupings										Average expenses of practice
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	
Solo	3.5	9.8	28.7	32.7	15.5	6.0	2.0	0.8	0.1	0.9	33.4
Two doctors	4.0	9.9	22.7	37.1	16.7	6.0	2.3	0.7	—	0.5	33.7
Group	9.0	11.4	13.9	24.7	27.7	9.3	2.6	0.7	0.3	0.3	34.7

SOURCE: See Table A9.

This table shows that expenses of practice, as indicated by the averages in the right-hand column, vary little whatever the mode of practice. Expenses for a two-doctor practice are just a fraction of one per cent higher than those for solo practice, and expenses for group practice are only 1.3 percentage points higher than those for solo practice. Group practice shows smaller figures in the 20-29 and 30-39 per cent ranges than either solo or two-doctor practices, and a somewhat higher concentration in the 40-49 per cent range. On the average, however, less difference shows up in this preliminary tabulation than is sometimes thought to exist.

TABLE A23**Patients Seen in a Week for All Doctors by Size of Community, Canada, 1967**

Size of community	Percentage of doctors seeing number of patients in each size group Patient number size groupings										Average number of patients seen
	0-20	31-40	41-60	61-80	81-100	101-120	121-140	141-160	161-180	181-200	
Under 2,000	2.6	2.6	5.7	6.6	15.7	8.7	9.8	13.1	35.2	—	124.4
2,000-5,000	2.2	4.3	3.9	8.6	13.8	7.3	9.3	13.6	37.1	—	125.4
5,000-10,000	3.2	3.8	5.1	8.5	15.8	11.1	8.9	9.5	35.1	—	121.6
10,000-25,000	3.8	5.7	8.9	9.1	15.3	8.7	7.9	11.7	28.9	—	113.1
25,000-100,000	5.2	9.4	11.0	10.0	14.4	7.8	8.6	11.2	22.3	—	103.4
100,000 Central	9.7	13.5	14.3	12.1	15.1	6.5	7.2	7.4	14.1	—	85.8
100,000 Suburban	3.0	7.8	8.0	7.8	16.3	6.3	9.2	14.5	27.0	—	113.4

SOURCE: See Table A9.

Table A23 shows two size groupings of patients seen in a week (including repeat visits) which seem to apply to a greater proportion of doctors than the others. These are the 81-100 group (about 15 per cent of doctors) and the 161-180 group (about 30 per cent of doctors). Overall averages of numbers of patients seen in a week seem to be quite consistent in the 120 to 125 range in towns under 10,000, with a gradual fall to about 85 in the central areas of big cities. The average jumps again to 113 in the suburban areas — the same figure as for towns of 10,000 to 25,000.

The gradual decline in number of patients seen as one approaches the centres of large cities probably reflects the concentration in these areas of more serious cases requiring more time; the outlying areas, by contrast, contain the more simple cases.

TABLE A24
Mode of Practice of All Doctors by Size of Community, Canada, 1967

Size of community	Percentage of doctors engaged in each type of practice		
	Solo	Two-doctor	Group
Under 2,000	62.1	27.8	13.1
2,000-5,000	43.8	19.8	37.8
5,000-10,000	47.1	14.8	39.9
10,000-25,000	52.2	16.1	34.7
25,000-100,000	56.8	14.3	30.8
100,000 Central	58.5	9.7	33.5
100,000 Suburban	56.2	18.6	27.2
Averages	55.0	14.0	31.0

SOURCE: See Table A9.

This table shows that solo practice is the predominant form in all sizes of community, and particularly common in towns under 2,000. Group practice accounts for only 13 per cent of the doctors in these areas, but increases to three times this figure in towns of 2,000 to 10,000. In terms of averages, solo practice still accounts for over half of all respondent doctors; two-doctor practice accounts for one-seventh, while group practice accounts for nearly one-third of all doctors — a sizeable increase from the estimated 10 per cent of a few years ago.

TABLE A25
Time Off of All Doctors by Size of Community, Canada, 1967

Size of Community	Percentage of doctors taking indicated no. of weeks time off									
	1	2	3	4	5	6	7	8	9	10+
Under 2,000	98.0	4.4	1.1	0.7	0.2	0.4	0.2	—	—	0.2
2,000-5,000	93.4	3.5	1.9	0.6	0.3	0.4	—	—	—	—
5,000-10,000	92.9	5.1	.15	0.3	—	—	—	—	—	—
10,000-25,000	95.4	2.9	0.9	0.4	0.3	0.2	0.2	—	—	—
25,000-100,000	94.1	3.9	0.8	0.5	0.2	.02	0.1	—	0.1	0.1
100,000 Central	94.0	4.0	0.9	0.5	0.3	0.3	0.1	—	—	—
100,000 Suburban	94.4	3.4	0.9	0.5	—	0.3	—	—	—	0.2

SOURCE: See Table A9.

The extraordinary factor about these results is the unusually high proportion of doctors who appear to take only one week off per year, a percentage varying between 93 and 95. Since this time is intended to cover holidays, continuing education and illness, one week appears to be remarkably little for a large proportion of doctors.

TABLE A26**Medical Enrolment in Canada by Year of Course, 1947-1948 to 1967-1968**

Year	First	Year of course Second	Third	Fourth	Total enrolment	Medical graduates
1947-48	827	842	756	675	3,100	632
1948-49	887	765	842	739	3,233	679
1949-50	897	798	761	822	3,278	791
1950-51	960	880	944	805	3,488	858
1951-52	873	891	858	836	3,458	783
1952-53	918	809	865	852	3,444	825
1953-54	982	901	844	916	3,643	896
1954-55	968	903	881	837	3,589	894
1955-56	1,035	883	877	856	3,651	816
1956-57	1,001	934	855	865	3,655	893
1957-58	1,012	916	928	830	3,686	836
1958-59	986	911	867	904	3,668	859
1959-60	946	882	863	858	3,549	863
1960-61	970	842	853	843	3,508	834
1961-62	1,006	857	808	854	3,525	846
1962-63	1,057	904	831	805	3,597	826
1963-64	1,086	951	858	803	3,698	773
1964-65	1,133	985	915	842	3,875	1,034
1965-66	1,128	1,050	948	897	4,023	788
1966-67	1,192	1,076	1,032	930	4,230	940
1967-68	1,233	1,127	1,037	1,019	4,416	1,002

SOURCES: J. A. MacFarlane, *Medical Education in Canada*, a study prepared for the Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 61 for the years 1947-48 to 1962-63.

DBS, *Survey of Higher Education*, Part II (cat. no. 81-211), Queen's Printer, Ottawa, January 1969 for graduates 1961-1962 to 1967-1968.

D. G. Fish, "Medical Students in Canadian Universities: Report of Statistics, 1967-68", *Canadian Medical Association Journal*, Vol. 98, No. 15, April 1968, pp. 715-721.

TABLE A27

Years of Education Required for a Licence to Practise Medicine, an International Comparison, Academic Year 1960-1961

Country	Primary	Second-ary	Pre-Medical	Medical	Internship	Total for licence to practice
Australia	6	5		6		17
Austria	4	8		5	3	20
Belgium	6	6		7		19
Canada—English	6	6	3	4	1	20
French	7	8		4	1	20
Denmark	7	5		7	1	20
England	6	6		6	1	19
Finland	4	8		6	1½-1	18½-19
France	5	7		6		18
West Germany	4	9		5½	2	20½
Israel	8	4	1½	5½		19
Italy	8	5		6	½	19½
Japan	6	6	2	4	1	19
Netherlands	6	6		7		19
New Zealand	7	5		6	1	19
Norway	7	5		6	1½	19½
Sweden	4	9		6½	1 ¹	19½
Switzerland	12-13			6½		18½-19½
U.S.A.	8	4	4	4	1	21

¹Recommended.

SOURCE: R. D. Fraser, *The Supply of Health Services: an International Comparison*, Queen's University, Kingston (unpublished).

TABLE A28

Applications for Entry to Canadian Medical Schools Compared with Enrolment in First Year, by University, 1961-1962 and 1962-1963

University	1961-1962		1962-1963	
	Number of applications	First-year enrolment	Number of applications	First-year enrolment
Dalhousie	213	66	321	71
Laval	207	128	196	133
Montreal	208	124	239	126
McGill	830	109	929	112
Ottawa	359	68	392	71
Queen's	76	60	102 ¹	59
Toronto	173	152	194 ¹	175
Western Ontario	105	60	132	60
Manitoba	210	63	247	70
Saskatchewan	109	39	147	40
Alberta	111	76	176	78
British Columbia	251	61	271	62

¹Excluded are applicants for admission to first-year medicine upon completion of second pre-medical year.

SOURCE: J. A. MacFarlane, *Medical Education in Canada*, a study prepared for the Royal Commission on Health Services, Queen's Printer, Ottawa, 1965, p. 69.

TABLE A29
Distribution of General Practitioners and Specialists
by Major Centres, Ontario, 1969

	General practitioners	G.P.'s with special interest	Certified specialists	Total
Total	3,388	988	4,125	8,501
Toronto	1,146	357	1,786	3,289
Hamilton	237	67	311	615
Kitchener	90	20	106	216
London	101	52	256	409
Ottawa	123	111	379	613
Sudbury	55	9	72	136
Windsor	111	39	135	285
Brampton	38	7	19	64
Brantford	32	8	38	78
Fort William-				
Port Arthur	41	14	69	124
Kingston	41	23	156	220
Niagara Falls	24	5	38	67
Oshawa	55	23	57	135
St. Catharines	66	21	74	161
Sarnia	26	11	61	98
Timmins	17	5	10	32
Welland	34	5	29	68
Guelph	23	6	45	74
Peterborough	28	9	61	98
Sault Ste. Marie	25	9	34	68
Rest of Province	1,075	187	389	1,651

SOURCE: Seccombe House.

TABLE A30
Distribution of Physicians by County, Ontario, 1969

County	G.P. with special interest	G.P.	Certified specialist	Total
Algoma	15	42	35	92
Brant	9	41	39	89
Bruce	1	25	2	28
Carleton	114	128	380	622
Cochrane	9	40	15	64
Dufferin	1	9	1	11
Dundas	—	8	2	10
Durham	—	20	1	21
Elgin	8	26	23	57
Essex	42	139	144	325
Frontenac	23	49	156	228

TABLE A30 (Continued)
Distribution of Physicians by County, Ontario, 1969

County	G.P. with special interest	G.P.	Certified specialist	Total
Glengarry	—	9	2	11
Grenville	—	9	3	12
Grey	111	26	24	61
Haldimand	—	19	3	22
Halton	16	98	85	199
Hastings	5	49	37	91
Huron	4	22	6	32
Kenora	2	25	4	31
Kent	10	53	24	87
Lambton	13	45	61	119
Lanark	55	27	5	37
Leeds	11	25	26	62
Lennox-Addington	3	10	1	14
Lincoln	21	82	75	178
Manitoulin	—	7	—	7
Middlesex	52	112	258	422
Muskoka	5	22	2	29
Nipissing	13	27	23	63
Norfolk	2	24	4	30
Northumberland	2	22	6	30
Ontario	26	87	60	173
Oxford	7	44	18	69
Parry Sound	4	19	3	26
Peel	225	114	67	206
Perth	4	36	19	59
Peterborough	10	34	61	105
Prescott	3	11	1	15
Prince Edward	1	14	2	17
Rainy River	1	11	—	12
Renfrew	11	32	10	53
Russell	1	5	—	6
Simcoe	13	88	46	147
Stormont	5	26	25	56
Sudbury	9	62	74	145
Thunder Bay	17	50	69	136
Timiskaming	6	23	6	35
Victoria	7	20	7	34
Waterloo	22	101	106	229
Welland	13	82	71	166
Wellington	7	40	48	95
Wentworth	60	197	268	525
York	339	1,047	1,717	3,103
Haliburton	—	5	—	5
Total	988	3,388	4,125	8,501

SOURCE: *The Canadian Medical Market by Counties*, Seccombe House, Toronto, 1965.

Personnel in the Dental Profession

The data obtained for dentists were quite complete. The few discrepancies are noted as they occur. The following quotation from *Survey of Dental Practice, 1963*, The Canadian Dental Association (p. 2), pertains to all tables taken from this book.

The high response to the 1963 survey ensures the basic representativeness of the sample. The sample is biased to the extent that dentists living in Quebec, dentists living in communities of under 2,500 or over 500,000 people, dentists over 55 and dentists graduating before 1930 are under-represented. This limitation should be kept in mind when applying the results of the survey to all Canadian dentists.

This section is divided into three parts: dentists, paradental care, and education of dentists. In all charts a dash (—) means “not available”.

According to Dr. W. G. McIntosh, D.D.S., in his paper, *Manpower Problems in the Dental Profession*, there were 6,544 dentists in Canada in 1966. Probably there were not more than 5,500 dentists providing general dental services, one for every 3,622 people. This means there was 26 minutes of chairside service per year for every man, woman and child in Canada. Only 4 per cent of private dental practitioners employ hygienists⁴. If all dentists were as productive as those who employ full-time auxiliaries, the estimated resulting increase in productivity would be comparable to adding 3,700 dentists to Canada's dental manpower. Many want only one assistant, however, and many cannot afford the necessary capital expenditures.

Dentistry experiences the same male-female imbalance in numbers as do other medical professions but to a much greater extent. One in eighteen dental students is a woman, one medical student in nine is a woman, one in three pharmacy students is female.⁵

Dentists

Not all the figures available agreed with those in Table A31. In the table obtained from the Royal College of Dental Surgeons of Ontario, the figures for Ontario were slightly lower for each year; for example, 2,438 in 1960, and 2,514 in 1965.

Since the population figures in some of the charts of the Royal College of Dental Surgeons of Ontario were not the same as those in the Canadian census, however, the data used here are those of the Canadian Dental Association. The College obtained their population figures from the *Municipal Handbook*. McFarlane's data⁶ for the Hall Commission's report is the same as Table A31

⁴Canadian Dental Association, *Survey of Dental Practice, 1963*, p. 48.

⁵Royal Commission on Health Services, Report, Vol. II, Queen's Printer, Ottawa, 1964, p. 27.

⁶B. A. McFarlane, *Dental Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Queen's Printer, Ottawa, 1964, p. 7.

except for the years 1962-1964. He cites the same source. Our data have been assumed to be more accurate for the purposes of this study.

The Royal College is the source of data for the Canadian Dental Association. Possibly the College figures do not include life members.

The 1961 census figure for dentists in Ontario is 2,299, while the figure of the Canadian Dental Association for Ontario is 2,513. The discrepancy is probably explained by the fact that some retired life members and some registered dentists who were doing postgraduate work did not sign as dentists in the census.

There are ninety-seven female dentists in Canada, fifty-eight of whom are in Ontario. One in three of the female dentists is employed in dental public health, as compared with one male in fifty.⁷

TABLE A31
Dentists by Province, 1881-1968

Year	Can.	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1968	6,826	46	30	199	133	1,607	2,810	300	213	536	808
1967	6,532	51	30	236	131	1,549	2,732	295	220	503	785
1966	6,396	43	31	230	133	1,516	2,687	288	207	501	760
1965	6,218	43	31	230	120	1,469	2,623	287	195	484	736
1964	6,103	47	32	189	121	1,446	2,599	289	187	467	726
1963	5,999	44	31	185	123	1,434	2,552	281	195	456	698
1962	5,906	43	29	190	124	1,417	2,522	283	193	434	671
1961	5,865	42	31	196	120	1,388	2,513	286	196	431	662
1960	5,780	43	35	193	114	1,384	2,477	277	192	412	653
1959	5,753	46	33	190	124	1,352	2,476	277	210	417	628
1958	5,564	41	34	191	125	1,306	2,370	246	209	412	630
1957	5,481	39	34	193	125	1,314	2,297	263	208	396	612
1956	5,416	35	33	198	122	1,294	2,270	255	217	383	609
1955	5,354	33	35	198	119	1,282	2,231	265	224	377	590
1954	5,298	32	34	198	116	1,273	2,220	262	215	371	577
1953	5,215	24	33	197	113	1,242	2,218	258	223	352	555
1952	5,071	21	29	196	110	1,208	2,154	261	218	328	546
1951	4,912	21	30	192	106	1,147	2,103	259	217	321	516
1950	4,627	19	29	171	105	1,090	1,995	240	209	283	486
1949	4,549	—	29	178	112	1,063	1,984	245	195	269	474
1948	4,601	—	28	192	108	1,059	2,032	251	195	272	464
1947	4,602	—	28	180	114	1,041	2,081	244	195	264	455
1946	4,565	—	28	188	105	1,014	2,107	234	191	290	408
1945	4,529	—	28	191	114	989	2,062	250	205	303	387
1944	4,405	—	23	183	98	958	2,026	252	208	282	375
1943	4,294	—	28	175	94	954	1,938	256	216	269	364
1941	4,210	—	28	178	118	933	1,891	249	219	242	352
1938	4,174	—	30	169	110	874	1,932	251	210	236	362
1931	4,039	—	29	161	124	831	1,852	251	223	231	337
1921	3,158	—	22	154	112	629	1,377	217	183	191	273
1911	2,183	—	22	125	98	327	1,127	130	89	105	160
1901	1,310	—	—	—	—	—	—	—	—	—	—
1891	753	—	—	—	—	—	—	—	—	—	—
1881	510	—	—	—	—	—	—	—	—	—	—

SOURCE: Canadian Dental Association, Bureau of Economic Research, *Dental Personnel in Canada, 1968*.

⁷Royal College of Dental Surgeons of Ontario, Brief to the Committee on the Healing Arts.

TABLE A32
Population per Dentist by Province, 1881-1968

Year	Can.	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1968	3,035	11,022	3,667	3,819	4,692	3,688	2,473	3,237	4,507	2,847	2,484
1967	3,064	9,674	3,618	3,203	4,708	3,732	2,548	3,265	4,342	2,909	2,387
1966	3,060	11,581	3,484	3,309	4,684	3,732	2,505	3,340	4,594	2,896	2,354
1965	3,093	11,419	3,452	3,313	5,142	3,786	2,511	3,338	4,836	2,959	2,361
1964	3,096	10,234	3,344	4,000	5,074	3,781	2,481	3,287	4,989	3,009	2,335
1963	3,096	10,682	3,419	4,032	4,935	3,742	2,485	3,327	4,769	3,004	2,377
1962	3,088	10,648	3,608	3,879	4,822	3,711	2,473	3,257	4,794	3,069	2,428
1961	3,047	10,667	3,322	3,709	4,908	3,705	2,432	3,168	4,668	2,995	2,420
1960	3,025	10,256	2,886	3,725	5,105	3,630	2,410	3,217	4,724	3,029	2,400
1959	2,969	9,391	3,030	3,731	4,605	3,627	2,351	3,159	4,243	2,892	2,449
1958	2,985	10,341	2,912	3,670	4,496	3,652	2,378	3,504	4,211	2,825	2,352
1957	2,934	10,643	2,920	3,599	4,437	3,522	2,353	3,232	4,234	2,836	2,285
1956	2,898	11,600	3,030	3,449	4,484	3,491	2,320	3,290	4,046	2,848	2,204
1955	2,855	11,970	2,886	3,399	4,538	3,423	2,293	3,106	3,897	2,804	2,195
1954	2,802	11,969	2,970	3,348	4,595	3,353	2,226	3,088	4,005	2,728	2,163
1953	2,772	15,583	3,030	3,315	4,655	3,361	2,159	3,093	3,780	2,764	2,171
1952	2,763	17,210	3,394	3,278	4,688	3,357	2,134	2,975	3,815	2,864	2,134
1951	2,791	16,714	3,200	3,323	4,830	3,460	2,126	2,965	3,839	2,844	2,203
1950	2,906	18,158	3,241	3,678	4,838	3,561	2,194	3,154	3,981	3,127	2,290
1949	2,819	—	3,207	3,511	4,446	3,563	2,155	3,045	4,297	3,175	2,283
1948	2,728	—	3,357	3,203	4,518	3,503	2,055	2,944	4,287	3,033	2,250
1947	2,671	—	3,357	3,378	4,193	3,486	1,967	2,979	4,272	3,042	2,204
1946	2,644	—	3,286	3,292	4,448	3,511	1,898	3,107	4,361	2,786	2,326
1945	2,638	—	3,250	3,199	4,044	3,539	1,922	2,908	4,078	2,667	2,408
1944	2,678	—	3,956	3,311	4,724	3,608	1,932	2,869	4,029	2,784	2,400
1943	2,714	—	3,214	3,377	4,936	3,553	2,004	2,828	3,926	2,885	2,390
1941	2,733	—	3,394	3,247	3,876	3,571	2,003	2,931	4,091	3,290	2,323
1938	2,646	—	3,100	3,248	3,973	3,594	1,882	2,849	4,390	3,288	2,097
1931	2,569	—	3,036	3,185	3,292	3,459	1,853	2,789	4,133	3,167	2,060
1921	2,783	—	4,028	3,401	3,463	3,753	2,130	2,812	4,139	3,081	1,921
1911	3,301	—	4,260	3,939	3,591	6,134	2,242	3,549	5,533	3,565	2,453
1901	4,100	—	—	—	—	—	—	—	—	—	—
1891	6,419	—	—	—	—	—	—	—	—	—	—
1881	8,480	—	—	—	—	—	—	—	—	—	—

SOURCE: Canadian Dental Association, Bureau of Economic Research, *Dental Personnel in Canada, 1968*.

TABLE A33
Population per Dentist, Ontario and Selected Countries, 1966

Ontario	2,505
U.S.A.	1,900
Sweden	1,500
Australia	2,300

SOURCE: Royal College of Dental Surgeons of Ontario, Brief to the Committee on the Healing Arts.

The three countries mentioned have better (lower) population per dentist figures. The figure for the U.S.A. is particularly relevant, since American health standards are very similar to Ontario's.

TABLE A34
Age Distribution of Ontario Dentists, 1966

Year of birth	Mid-range age 1967	Number	Distribution Percentage	Cumulative Percentage
1870-1874	95	2	0.07	99.99
1875-1879	90	6	0.22	99.92
1880-1884	85	9	0.33	99.70
1885-1889	80	22	0.80	99.37
1890-1894	75	78	2.84	98.57
1895-1899	70	193	7.03	95.73
1900-1904	65	183	6.67	88.70
1905-1909	60	163	5.94	82.03
1910-1914	55	150	5.46	76.09
1915-1919	50	246	8.96	70.63
1920-1924	45	386	14.06	61.67
1925-1929	40	331	12.06	47.61
1930-1934	35	345	12.57	35.55
1935-1939	30	380	13.84	22.98
1940-1944	25	251	9.14	9.14
Total		2,745	99.99	

SOURCE: Ontario Council of Health, Ontario Health Manpower Committee, *Appendix B*, February 24, 1967. The main source of the Ontario Council on Health is the records of the Royal College of Dental Surgeons of Ontario.

TABLE A35
Changes in the Number of Dentists Registered in Ontario, 1955-1968

	Additions to register			Licences not renewed					Net increase over year before
	Total as of Jan. 1	New graduates	Moves to Ontario	Total	Deaths	Retirements	Moves from Ontario	Other	
1968	2,810	131	26	157	7	19	6	6	38 1191 1192
1967	2,732	113	42	155	29	21	4	23	77 78 —
1966	2,687	113	62	175	36	54	16	24	130 45 45
1965	2,623	146	11	157	26	41	7	19	93 64 64
1964	2,599	134	6	140	44	37	14	21	116 24 24
1963	2,552	134	9	143	33	39	17	7	96 47 47
1962	2,522	120	6	126	42	37	17	—	96 30 30
1961	2,513	78	8	86	16	24	6	—	46 40 9
1960	2,477	107	9	116	20	12	48	—	80 36 36
1959	2,476	3	7	10	30	29	20	—	79 -69 1
1958	2,370	86	5	91	39	9	3	—	51 40 106
1957	2,297	96	7	103	33	24	10	—	67 36 73
1956	2,270	83	8	91	35	14	10	—	59 32 27
1955	2,231	79	8	87	31	20	9	—	60 27 39

SOURCE: Canadian Dental Association, Bureau of Economic Research, *Dental Personnel in Canada, 1955-1968*.

¹Total of additions minus total of those not renewed.

²Subsequent totals subtracted.

The discrepancy in the "Net increase over year before" column of Table A35 is completely within the Canadian Dental Association's figures. No doubt they have become more accurate in their measurements, so that discrepancies in past data emerge.

TABLE A36
Response of Dentists to Survey, by Province, 1963

Region and province	Dentists sent questionnaires	Dentists responding	Percentage
Atlantic	416	167	40.1
Newfoundland	35	20	57.1
Prince Edward Island	32	14	43.8
Nova Scotia	220	86	39.1
New Brunswick	129	47	36.4
Quebec	1,457	509	34.9
Ontario	2,610	1,223	46.9
Prairies	966	467	48.3
Manitoba	310	120	38.7
Saskatchewan	189	104	55.0
Alberta	467	243	52.0
British Columbia	727	355	48.8
Canada	6,176	2,735	44.3

SOURCE: Canadian Dental Association, Bureau of Economic Research, *Survey of Dental Practice, 1963*.

TABLE A37

**Dentists: Gross Income, Expenses and Net Income from Private Practice by
Number of Chairs and Full-time Employees, 1963**

Number of chairs and number and type of full-time employees	Percentage reporting dentists	Gross income \$	Expenses \$	Net income from private practice
1 chair				
no employees	11.0	15,316	6,219	9,097
1 assistant	18.5	23,923	10,587	13,336
1 secretary	1.2	20,189	8,120	12,069
all other	1.0	30,394	14,831	15,563
2 chairs				
no employees	4.4	22,536	9,428	13,108
1 assistant	39.6	28,411	12,437	15,974
1 hygienist and 1 assistant	0.3	39,841	19,990	19,851
1 technician and 1 assistant	1.0	32,569	15,227	17,342
2 or more assistants	5.4	36,868	16,974	19,894
1 secretary	1.4	26,666	11,122	15,544
1 assistant and 1 secretary	5.0	36,053	17,065	18,988
all other	1.6	34,428	17,906	16,522

TABLE A37 (Continued)**Dentists: Gross Income, Expenses and Net Income from Private Practice by Number of Chairs and Full-time Employees, 1963**

Number of chairs and number and type of full-time employees	Percentage reporting dentists	Gross income \$	Expenses \$	Net income from private practice
3 or more chairs				
no employees	0.5	36,189	18,725	17,464
1 assistant	3.3	33,139	14,927	18,212
2 or more assistants	1.9	40,347	19,389	20,958
1 assistant and				
1 secretary	1.4	40,665	20,371	20,294
2 or more assistants and 1 secretary	0.4	40,093	19,958	20,135
all other	2.1	48,427	26,958	21,469
Total	100.0	27,723	12,475	15,248

SOURCE: See Table A36.

TABLE A38**Dentists: Number of Hours per Week Spent in Office by Type of Office Activity and by Province, 1963**

Region and province	Total	Type of activity		
		Chairside	Laboratory	Other
Atlantic	41	35	3	3
Newfoundland	36	30	4	2
Prince Edward Island	39	33	2	4
Nova Scotia	42	35	3	4
New Brunswick	41	34	4	3
Quebec	43	35	5	3
Ontario	41	34	3	4
Prairie	40	33	3	4
Manitoba	41	33	4	4
Saskatchewan	40	32	4	4
Alberta	40	33	3	4
British Columbia	40	33	3	4
Canada	41	33	4	4

SOURCE: See Table A36.

TABLE A39

Dentists: Number of Hours per Week Spent in Office by Type of Office Activity and by Age, 1963

Age	Total	Type of activity		
		Chairside	Laboratory	Other
Under 25	44	35	5	4
25-29	43	36	3	4
30-34	42	35	3	4
35-39	42	35	3	4
40-44	41	34	3	4
45-49	42	35	3	4
50-54	41	33	4	4
55-59	40	32	4	4
60-64	38	30	4	4
65-69	36	28	4	4
70-74	37	25	8	4
75 and over	31	25	4	2
Total	41	33	4	4

SOURCE: See Table A36.

TABLE A40

Dentists: Number of Hours per Week Spent in Office, by Type of Office Activity and by Type of Practice, 1963

Type of practice	Total	Type of activity		
		Chairside	Laboratory	Other
General practitioner	41	33	4	4
Specialist	41	31	4	6
Oral surgeon	41	29	4	8
Orthodontist	42	31	5	6
Periodontist	43	35	1	7
Other	38	30	4	4
Total	41	33	4	4

SOURCE: See Table A36.

TABLE A41

Dentists: Hours Worked per Year, Gross Income per Chairside Hour and Net Income per Hour Worked, by Province, 1963

Region and province	Hours worked	Gross income per chairside hour	Net income per hour worked
Atlantic	1,946	\$13.54	\$6.68
Newfoundland	1,665	19.38	9.66
Prince Edward Island	1,879	12.62	6.81
Nova Scotia	2,000	12.38	6.06
New Brunswick	1,977	13.78	6.74
Quebec	2,033	12.87	6.08
Ontario	1,907	17.56	8.38
Prairie	1,882	18.86	8.50
Manitoba	1,906	17.04	7.56
Saskatchewan	1,854	19.96	9.03
Alberta	1,885	19.16	8.66
British Columbia	1,864	19.15	8.91
Canada	1,924	16.80	7.91

SOURCE: See Table A36.

TABLE A42

Dentists: Amount of Time Absent from Practice by Cause of Absence, and by Province, 1963

Region and province	Weeks on vacation	Days absent due to illness	Days absent due to dental activities
Atlantic	3	4	6
Newfoundland	3	5	7
Prince Edward Island	3	6	4
Nova Scotia	3	3	6
New Brunswick	3	6	7
Quebec	3	5	5
Ontario	4	5	6
Prairie	4	3	7
Manitoba	4	4	9
Saskatchewan	4	4	6
Alberta	4	3	7
British Columbia	4	4	7
Canada	4	4	6

SOURCE: See Table A36.

TABLE A43**Dentists: Number of Patients and Patient Visits by Province, 1963**

Region and province	Patients per dentist		Visits per dentist	
	Mean	Median	Mean	Median
Atlantic	1,500	1,380	3,327	3,317
Newfoundland	1,878	2,000	3,744	3,749
Prince Edward Island	1,251	1,250	2,971	3,250
Nova Scotia	1,426	1,392	3,178	3,142
New Brunswick	1,502	1,299	3,481	3,849
Quebec	1,544	1,342	2,879	2,720
Ontario	1,312	1,228	3,472	3,435
Prairie	1,680	1,621	3,589	3,407
Manitoba	1,443	1,384	3,422	3,445
Saskatchewan	2,142	2,166	3,972	3,768
Alberta	1,585	1,491	3,496	3,269
British Columbia	1,194	1,141	3,321	3,200
Canada	1,417	1,295	3,380	3,313

SOURCE: See Table A36.

TABLE A44**Dentists: Number of Patients and Patient Visits by City Size, 1963**

City size	Patients per dentist		Visits per dentist	
	Mean	Median	Mean	Median
Under 1,000	1,258	1,200	2,136	2,124
1,000-2,499	1,982	1,947	3,345	3,160
2,500-4,999	1,674	1,710	3,528	3,461
5,000-9,999	1,883	1,833	3,634	3,707
10,000-14,999	1,667	1,500	3,474	3,374
15,000-24,999	1,516	1,391	3,402	3,480
25,000-29,999	1,597	1,478	3,540	3,649
30,000-49,999	1,407	1,330	3,392	3,427
50,000-99,999	1,431	1,262	3,575	3,489
100,000-249,999	1,471	1,378	3,835	3,554
250,000-499,999	1,383	1,285	3,508	3,369
500,000 and over	1,082	930	3,007	2,950
Total	1,417	1,295	3,380	3,313

SOURCE: See Table A36.

TABLE A45**Dentists: Number of Patients and Patient Visits by Type of Practice, 1963**

Type of practice	Patients per dentist		Visits per dentist	
	Mean	Median	Mean	Median
General practitioner	1,449	1,328	3,364	3,310
Specialist	899	472	3,817	3,499
Oral surgeon	2,420	1,750	5,861	4,250
Orthodontist	357	274	3,270	3,357
Periodontist	654	400	3,435	3,250
Other	1,077	1,143	3,470	3,416
Total	1,417	1,295	3,380	3,313

SOURCE: See Table A36.

TABLE A46**Dentists: Average Length of Appointments by Province, 1963**

Region and province	Percentage of appointments by average length				
	Less than 30 minutes	30 minutes	45 minutes	1 hour	Longer than 1 hour
Atlantic	2.9	56.8	30.5	9.8	0.0
Newfoundland	11.1	72.2	16.7	0.0	0.0
Prince Edward Island	0.0	70.0	20.0	10.0	0.0
Nova Scotia	1.4	50.8	38.8	9.0	0.0
New Brunswick	2.5	56.4	25.7	15.4	0.0
Quebec	2.1	54.5	31.6	10.4	1.4
Ontario	4.3	61.9	26.2	6.7	0.9
Prairie	3.7	58.4	26.2	11.1	0.6
Manitoba	2.3	56.5	32.9	8.3	0.0
Saskatchewan	5.6	63.7	15.9	13.6	1.2
Alberta	3.5	56.9	27.9	11.1	0.6
British Columbia	2.0	44.4	39.3	12.9	1.4
Canada	3.4	57.4	29.1	9.1	1.0

SOURCE: See Table A36.

TABLE A47
Dentists: Average Length of Appointments by City Size, 1963

City size	Percentage of appointments by average length				
	Less than 30 minutes	30 minutes	45 minutes	1 hour	Longer than 1 hour
Under 1,000	0.0	33.3	44.4	22.3	0.0
1,000-2,499	2.6	46.7	33.3	16.0	1.4
2,500-4,999	1.9	52.3	32.0	13.1	0.7
5,000-9,999	5.6	61.2	25.7	7.5	0.0
10,000-14,999	1.5	62.0	25.6	9.3	1.6
15,000-24,999	5.2	62.4	27.1	5.3	0.0
25,000-29,999	0.0	61.9	25.4	12.7	0.0
30,000-49,999	5.2	55.4	31.8	7.6	0.0
50,000-99,999	3.6	65.6	25.3	5.5	0.0
100,000-249,999	6.3	63.5	24.9	4.7	0.6
250,000-499,999	3.9	57.3	29.7	8.1	1.0
500,000 and over	2.3	53.3	31.3	11.0	2.1
Total	3.4	57.4	29.1	9.1	1.0

SOURCE: See Table A36.

TABLE A48
Dentists: Average Length of Appointments by Age of Dentist, 1963

Age	Percentage of appointments by average length				
	Less than 30 minutes	30 minutes	45 minutes	1 hour	Longer than 1 hour
Under 25	0.0	20.8	45.8	29.2	4.2
25-29	1.1	49.2	37.7	10.8	1.2
30-34	3.2	54.2	30.2	11.0	1.4
35-39	6.4	62.1	26.3	4.6	0.6
40-44	5.8	60.7	27.9	4.8	0.8
45-49	3.4	60.6	27.5	8.1	0.4
50-54	1.4	66.4	21.9	8.8	1.5
55-59	0.7	65.7	24.2	9.4	0.0
60-64	0.0	57.8	32.4	9.0	0.8
65-69	0.7	45.2	35.8	17.5	0.8
70-74	4.0	46.0	26.0	22.0	2.0
75 and over	0.0	61.5	15.4	23.1	0.0
Total	3.4	57.4	29.1	9.1	1.0

SOURCE: See Table A36.

TABLE A49**Dentists: Average Length of Appointments by Organization of Practice, 1963**

Organization of practice	Percentage of appointments by average length				
	Less than 30 minutes	30 minutes	45 minutes	1 hour	Longer than 1 hour
Private practice	3.4	57.4	29.1	9.1	1.0
Solo practice	3.6	57.3	29.5	8.7	0.9
Sharing costs	2.3	55.9	28.7	11.7	1.4
Partnership	1.2	61.4	26.5	10.9	0.0

SOURCE: See Table A36.

TABLE A50**Dentists: Average Length of Appointments by Type of Practice, 1963**

Type of practice	Percentage of appointments by average length				
	Less than 30 minutes	30 minutes	45 minutes	1 hour	Longer than 1 hour
General practitioner	3.2	57.3	29.5	9.2	0.8
Specialist	8.8	57.5	21.3	7.9	4.5
Oral surgeon	14.2	81.0	4.8	0.0	0.0
Orthodontist	10.0	62.0	16.0	10.0	2.0
Periodontist	0.0	37.5	50.0	12.5	0.0
Other	6.6	46.7	23.3	10.0	13.4
Total	3.4	57.4	29.1	9.1	1.0

SOURCE: See Table A36.

TABLE A51
Full-Time and Part-Time Salaried Dentists by Employing Agency and Type of Occupation, Ontario, 1968

Employing agency	Type of occupation								Total	
	Administrative		Teaching		Clinical		Research			
	full time	part time	full time	part time	full time	part time	full time	part time	full time	part time
National gov't.	—	—	—	—	1	—	—	—	1	—
Provincial gov't.	2	—	—	—	11	1	—	—	13	1
Municipal gov't.	7	—	—	—	16	33	—	—	23	33
Dept. of Veterans Affairs	2	—	—	—	9	—	—	—	11	—
Nat. Health & Welfare	3	—	—	—	1	—	1	—	5	—
Royal Can. Dental Corps.	12	—	3	—	53	—	—	—	68	—
Canadian Red Cross	—	—	—	—	6	—	—	—	6	—
Board of Education	1	—	—	1	10	5	—	—	11	5
Health unit	—	1	—	—	1	—	—	—	1	1
Hospital	—	1	—	—	15	2	1	—	16	3
Provincial mental or TB hospital	1	—	—	—	11	—	—	—	12	—
Dental infirmary for children	—	—	—	—	—	—	—	—	—	—
Industry	—	—	—	—	1	—	—	—	1	—
University	4	—	29	88	—	2	3	3	36	93
Dental association	4	—	—	—	—	—	—	—	4	—
Employed by another dentist	—	—	—	—	47	15	—	—	2	6
Other	—	—	—	—	1	—	—	—	1	2
Not specified	—	—	—	—	—	—	—	—	3	20
Total	36	2	32	88	183	59	5	3	262	178

SOURCE: Canadian Dental Association, Bureau of Economic Research, mimeographed material.

TABLE A52
Ontario Dentists Limiting Their Activities to Specialties, 1955-1968

	Total	Oral surgery	Ortho- dontics	Paedo- dontics	Perio- dontics	Prosthodontics
1968	178	40	87	16	35	0
1967	165	36	85	11	33	0
1966	153	37	79	9	28	0
1965	130	35	74	—	21	0
1964	129	35	74	—	20	0
1963	125	35	71	—	19	0
1962	123	34	67	6	16	0
1961	116	35	61	6	14	0
1960	108	33	56	6	13	0
1959	104	33	51	6	14	0
1958	103	34	50	6	13	0
1957	93	31	44	5	13	0
1956	92	30	42	5	15	0
1955	89	28	41	5	15	0

SOURCE: Canadian Dental Association, Bureau of Economic Research, mimeographed material.

It seems that figures such as these can never be taken as perfectly accurate. As seen in the table, the number of specialists in 1966 is 153. The Ontario Council on Health claims that the figure is 156. We shall have to disregard such differences.

Paradental Care

TABLE A53
Dental Hygienists in Ontario, 1960-1968

Year	Number of dental hygienists	Hygienist/ dentist ratio
1968	297	1/14
1967	218	1/12
1966	189	1/14
1965	116	1/23
1964	98	1/27
1963	57	
1962	58	
1961	48	
1960	42	

SOURCE: Canadian Dental Association, Bureau of Economic Research, mimeographed material.

The Ontario Dental Hygienists Association had 127 members in 1967, 104 of which were actively practising. According to the Royal College, less than two-thirds of the hygienists on their list are practising.

The only school for hygienists in Ontario is in Toronto. It can graduate fifty hygienists per year. Oswald Hall's survey of 1961 found that when a hygienist

works full time she achieves a respectable independent status. When she works part time, however, she is not very well accepted. In his survey, Hall found that 46 per cent of the dentists wanted a hygienist; 46 per cent felt that the idea was good but that there were practical difficulties, such as public acceptance; and 9 per cent were opposed to the idea. McFarlane gave no statistics on hygienists in his study.

TABLE A54
Dental Nurses and Assistants (Females) in Ontario, May 15, 1967¹

Hamilton	133
Inter-county	49
Kingston	31
Lakehead	23
London	14
Niagara District	41
Ottawa	72
Sarnia	13
Simcoe	19
Toronto	202
Windsor	15
Independent	12
Total	624
Decrease from last year's total	168

¹See the important note in the text.

SOURCE: Ontario Dental Nurses and Assistants Association, 1967.

It is very difficult to calculate the number of dental nurses and dental assistants in Ontario. One problem is that the nursing assistant can be a registered nurse or have no formal training at all. The number of assistants according to membership in the provincial association is given in Table A54. These data are not useful, however, as this association admits to a very low percentage membership.

In his survey in 1961, Hall found 216 dentists (those interviewed) employed 233 assistants. Thus, we can estimate that the 5,865 dentists in Canada employed $\frac{5865 \times 233}{216}$ or 6,322 assistants. McFarlane estimated that for 1962, 4,700 full-time assistants and 300 part-time assistants were employed in Canada. The Canadian Dental Association's survey in 1963 found that 82 per cent of the dentists in Ontario employed dental assistants and that this was close to the national average. Thus, taking the number of dentists from Table A31, the number of assistants employed in Canada in 1963 was 4,919 and in Ontario, 2,093. In 1966-1967, therefore, there were roughly 2,300 to 2,400 dental nurses and nursing assistants in Ontario.

Hall found a few noteworthy points on dental assistants. Only in very exceptional cases were assistants with no formal training allowed to do the specific tasks of the hygienist. Auxiliaries do provide the dentist with a larger net income.

There is no correlation, however, between the dentist's income and the number of appointments handled per day, and the assistant's education. Two-thirds of those who had taken the assistant's course were employed in the large metropolitan areas.

TABLE A55
Education¹ of Dental Assistants in Canada, 1961

	Percentage
Quit school in grade 12 or 13	42
Quit between grades 9 and 11	32
Only elementary school	1
Registered nurses	6
Attended university	1
Unknown	18

¹In addition, 6 per cent had taken a dental assistant's course and 3 per cent had attended business school.

SOURCE: Oswald Hall, *Utilization of Dentists in Canada*, Queen's Printer, Ottawa, 1964, p. 28.

TABLE A56
Dentists Employing Specified Combination of Full-Time Personnel, 1963

Number and type of personnel	Ontario %	Canada %
No full-time employees	14.9	16.1
1 secretary	2.5	2.8
1 assistant	62.9	60.8
1 assistant and 1 secretary	7.8	6.5
2 or more assistants	5.8	7.4
2 or more assistants and 1 secretary	0.5	0.8
1 technician	0.2	0.4
1 technician and 1 assistant or 1 secretary	1.3	1.7
1 technician, 1 assistant and 1 secretary	0.4	0.3
1 dentist and 2 or more assistants	0.2	0.3
1 hygienist and 1 assistant	0.8	0.5
Other combinations	2.7	2.4
Total	100.0	100.0

SOURCE: See Table A36.

Hall found that specialists make use of auxiliaries more than regular dentists do.

TABLE A57
Dental Laboratories and Dental Technicians, 1960, 1967

Employees	Ontario 1967	Ontario 1960	Canada 1960
Supervisory and office: Male	—	206	630
Female	—	30	69
Technicians: Male	—	371	843
Female	—	98	178
Total	772	705	1,720
Number of Laboratories	258	158	499

SOURCE: Ontario Council on Health and Canadian Dental Association, Bureau of Economic Research, mimeographed material.

There now exists a two (or three) year program for dental technicians under the Department of Education of Ontario. It was set up by the Provincial Institute of Trades and Occupations. According to the Ontario Council on Health, an adequate supply of technicians is forthcoming.

Education of Dentists

There are three ways of obtaining a licence to practise dentistry in Ontario:

- 1) by obtaining a D.D.S. degree from an Ontario university;
- 2) by passing examinations of National Dental Examination Board of Canada;
or
- 3) by passing examinations of Royal College of Dental Surgeons of Ontario.

TABLE A58
Number Registering in Dentistry in Ontario by Different Means

	Method 1	Method 2	Method 3	Total
1966	116	8	10	134
1965	114	9	10	133
1964	117	8	5	130
1963	105	6	11	122

SOURCE: The Royal College of Dental Surgeons of Ontario, Brief to the Committee on the Healing Arts.

TABLE A59
Recruitment of Students, University of Toronto Faculty of Dentistry,
1955-1956 to 1967-1968

Year	Applications	Fully documented applications	Accepted and enrolled
1967-1968	602	—	123
1966-1967	572	352	124
1965-1966	570	256	124
1964-1965	467	303	124
1963-1964	450	280	124
1962-1963	439	240	124
1959-1960 ¹	125	102	100
1958-1959	166	133	98
1957-1958	145	118	85
1956-1957	105	88	72
1955-1956	150	129	76

SOURCE: University of Toronto, Faculty of Dentistry, Brief to the Committee on the Healing Arts.

¹Large recruitment program undertaken in late 1950's.

The Royal College of Dental Surgeons of Ontario estimates that needs for dental care are down by 66 per cent because of fluoridation of the water supplies. In spite of this, however, many feel there is still a real shortage of dentists, especially in some rural regions of Ontario. From 1958 to 1966 the enrolment in Canadian dental schools almost doubled. Enrolment in 1958 was 747, and in 1966 it was 1,346.

The Faculty of Dentistry at the University of Toronto can admit fifty hygienists per year into a two-year course and 125 new students each year in dentistry. In 1966-1967 there was a total of 655 students: ninety-seven hygienists (the two classes); 500 undergraduate dentists; and fifty-eight postgraduate and graduate dentists. Most of the applicants to the University of Toronto Faculty of Dentistry are from the Metro Toronto area. Eighty per cent of these people stay in Toronto after graduation. Of those from small towns, only 50 per cent return. (At another point in their brief to the Committee on the Healing Arts, the Faculty of Dentistry used the figure 43 per cent.) This situation aggravates the problem of rural-urban distribution within the province.

In the fall of 1968, the University of Western Ontario opened a Faculty of Dentistry. Its capacity was to be as follows: fifty-two students in each of four years of dentistry; twenty dental hygienists in each of two years; seventeen to twenty graduate students in clinical disciplines.

There is very little formal training for dental assistants. The course offered at the Toronto Faculty of Dentistry was discontinued in 1959. Now there are three formal day courses operating on an experimental basis. Also, extension courses are offered by local dental societies in Ontario.

TABLE A60

Teaching Staff at the University of Toronto Faculty of Dentistry, 1967-1968

Full time	29
Half time	7
Part time	187

SOURCE: Canadian Dental Association, Bureau of Economic Research, mimeographed material.

Nursing: Registered Nurses and Nursing Assistants

This portion is divided into two sections of notes: an inventory of nurses and nursing assistants; and the education of nurses and nursing assistants. The information contained in this introductory section is taken from *Manpower Problems in the Nursing Profession, 1967*, by Helen K. Mussallem, Executive Director of the Canadian Nurses' Association.

At this time in Canada, there is no shortage of qualified nurses. There is, however, such a waste of nursing skills from poor utilization of nursing time, turnover of staff, emigration and non-practising personnel that there is a shortage of available nursing hours. Unless corrected, the substandard levels of salaries and working conditions now prevailing in the profession will create, within a few years, an actual shortage of nurses. Since 1950, the percentage of qualified women seeking entry into the profession has declined by more than 50 per cent and the decline is continuing.

In Canada as a whole there is a turnover each year of general staff nurses of 61 per cent. It has been estimated that the measurable cost of replacing one nurse in a large metropolitan hospital is approximately \$500. This means that in Canada it costs approximately twenty million dollars per year for turnover of general staff nurses. The turnover rate for full-time qualified nursing assistants is 42.94 per cent; and for orderlies, 41.95 per cent.

Recruitment into schools of nursing has steadily declined. In 1940, about 25 per cent of female students in Canada at high school graduation level enrolled in a school of nursing. By 1950, this had dropped to 20 per cent and by 1960, to 10 per cent. Each year the figure continues to decline.

In 1965, 2,076 nurses from fifty-two countries became registered in Canada — the largest number coming from Great Britain (847), the Philippines (550) and the U.S.A. (174). In 1966, Canada lost approximately 2,000 registered nurses; 1,620 emigrated to the United States.

Inventory*Nurses*

There are numerous figures for the number of nurses in Ontario. Confusion arises because many who are practising are not registered nurses. The following are all figures for Ontario, 1965.

Membership in Registered Nurses' Association of Ontario:

Active	16,352	
Associate	4,827	
Inactive	2,759	
Total		23,938
Canadian Nurses' Association (members for Ontario).....		44,963
College of Nurses of Ontario.....		48,922

The reason for the different figures is that the Canadian Nurses' Association does not count the new registrants of that year. The new registrants in 1965 totaled 3,937. This gives a total of 48,900 and leaves only a small discrepancy. For 1967 there is more encouraging information from the Canadian Nurses' Association Research Unit.

Total number of nurses in Ontario.....	54,492
Number not employed in nursing.....	14,164
Number employed in nursing.....	40,328

The Canadian Nurses' Association, however, often uses 37,018 instead of 40,328 because 3,310 nurses did not report their employment status.

Full time	25,737	} 37,018
Part time	11,281	
Not reported	3,310	
	<u>40,328</u>	

According to the College of Nurses of Ontario, the number of registered nurses in Ontario in 1967 was 51,432.

TABLE A61
Membership in the Registered Nurses' Association of Ontario, 1930-1969

Year	Active membership	Total membership ¹
1969	13,002	—
1965	16,352	23,938
1960	16,780	24,092
1950	7,545	n/a
1940	5,139	n/a
1930	1,685	n/a

¹Categories of associate and inactive membership were deleted in 1967.
SOURCE: Registered Nurses' Association of Ontario, Brief to the Committee on the Healing Arts.

TABLE A62
Registrants in the College of Nurses of Ontario, 1930-1968

Year	Number registered
1968	59,115
1965	48,896 ¹ ²
1960	34,819 ³
1950	18,300
1940	13,203
1930	7,965

SOURCE: College of Nurses of Ontario Brief to the Committee on the Healing Arts.

¹Approximations: 44,000 resident in Ontario
 33,000 practising in Ontario.

²It is estimated that there are 30,000 or more practising with no preparation. Twenty-nine per cent are working only part time.

³In the 1961 census 56,000 said they were in nursing in some capacity in Ontario; 61,699 said this for Canada (Hall Commission, Vol. I).

But according to the figures from the College's brief to the Committee there were 29,000 registered nurses and 39,000 registered nursing assistants.

TABLE A63
Registered Nurses, Employed in Nursing, Classified by Field of Employment and Employment Status, Ontario, 1967

Field of employment	Total number	Employment status			
		Full time in nursing		Part time in nursing	
		Number	Per cent	Number	Per cent
Totals	37,018	25,737	100.0	11,281	100.0
Hospital or other institution	29,623	20,294	78.9	9,329	82.7
School of nursing	1,378	1,276	5.0	102	.9
Private practice	1,431	649	2.5	782	6.9
Public health (other than school health)	2,140	1,821	7.1	319	2.8
School health	280	162	.6	118	1.0
Occupational health	818	675	2.6	143	1.3
Office (physician or dentist)	1,109	696	2.7	413	3.7
Other specified field	132	112	.4	20	.2
Field not reported	107	52	.2	55	.5

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A64
Registered Nurses, Employed in Nursing, Classified by Field of Employment and
Age Group, Ontario, 1967

Age group	Number of nurses by field of employment									
	Total number	Hospital or other institution	School of nursing	Private practice	Public health (other than school health)	School health	Occupational health	Office (physician or dentist)	Other specified field	Field not reported
Totals, number	37,018	29,623	1,378	1,431	2,140	280	818	1,109	132	107
per cent	100.0	80.0	3.7	3.9	5.8	.8	2.2	3.0	.3	.3
24 and under	5,875	5,351	129	49	210	6	24	101	2	3
25-29	8,367	6,987	392	154	423	34	95	246	15	21
30-34	5,067	4,144	249	139	246	21	84	166	12	6
35-39	4,016	3,181	165	122	247	39	86	146	16	14
40-44	3,200	2,424	123	134	243	47	93	113	19	4
45-49	2,979	2,152	108	139	275	43	112	121	17	12
50-54	2,541	1,765	83	159	227	45	141	91	23	7
55-59	2,086	1,531	59	157	143	23	90	66	7	10
60 and over	1,873	1,270	42	320	75	16	76	40	14	20
Age not reported	1,014	818	28	58	51	6	17	19	7	10

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A65
Registered Nurses, Employed in Nursing, Classified by Field of Employment and Marital Status, Ontario, 1967

Marital status	Number of nurses by field of employment						
	Total number	Hospital or other institution	School of nursing	Private practice	Public health (other than school health)	School health	Occupational health
Totals, number	37,018	29,623	1,378	1,431	2,140	280	818
per cent	100.0	80.0	3.7	3.9	5.8	.8	2.2
Single	13,644	10,647	719	543	1,003	49	312
Married	21,278	17,494	591	714	977	201	419
Other specified status	2,091	1,477	68	174	160	30	87
Marital status not reported	5	5	—	—	—	—	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A66
Registered Nurses, Employed in Nursing, Classified by Field of Employment and Sex, Ontario, 1967

Sex	Number of nurses by field of employment						
	Total number	Hospital or other institution	School of nursing	Private practice	Public health (other than school health)	School health	Occupational health
Totals, number	37,018	29,623	1,378	1,431	2,140	280	818
per cent	100.0	80.0	3.7	3.9	5.8	.8	2.2
Female	36,697	29,363	1,364	1,427	2,121	277	799
Male	318	257	14	4	19	3	19
Sex not reported	3	3	—	—	—	—	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A67
Registered Nurses, Employed in Nursing, Classified by Field of Employment and
Type of Position, Ontario, 1967

Type of position	Number of nurses by field of employment									
	Total number	Hospital or other institution	School of nursing	Private practice	Public health (other than school health)	School health	Occupational health	Office (physician or dentist)	Other specified field	Field not reported
Totals, number	37,018	29,623	1,378	1,431	2,140	280	818	1,109	132	107
per cent	100.0	80.0	3.7	3.9	5.8	.8	2.2	3.0	.3	.3
Director or assistant	762	558	131	2	49	5	7	—	10	—
Supervisor or assistant	2,327	1,973	—	1	278	6	54	11	3	1
Instructor	1,231	34	1,181	—	7	—	—	—	9	—
Head nurse or assistant	3,807	3,582	—	—	4	17	153	51	—	—
General duty or staff nurse	26,966	23,288	6	3	1,771	248	596	1,041	11	2
Other specified position	1,767	184	11	1,425	30	3	8	6	99	1
Position not reported	158	4	49	—	1	1	—	—	—	103

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A68
Registered Nurses, Employed in Nursing, Classified by Field of Employment and Highest Level of Educational Preparation, Ontario, 1967

Field of employment	Highest level of educational preparation											
	Total number	Diploma program leading to R.N.		Some post-basic credits towards a baccalaureate degree		Baccalaureate degree		Master's degree		Doctorate		
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Totals	37,018	32,754	100.0	2,088	100.0	2,012	100.0	158	100.0	6	100.0	
Hospital or other institution	29,623	27,380	83.6	1,184	56.7	1,019	50.7	38	24.0	2	33.3	
School of nursing	1,378	547	1.7	258	12.4	490	24.4	80	50.6	3	50.0	
Private practice	1,431	1,353	4.1	49	2.3	27	1.3	2	1.3	—	—	
Public health (other than school health)	2,140	1,294	3.9	460	22.0	371	18.4	14	8.9	1	16.7	
School health	280	222	.7	18	.9	37	1.8	3	1.9	—	—	
Occupational health	818	744	2.3	50	2.4	22	1.1	2	1.3	—	—	
Office (physician or dentist)	1,109	1,057	3.2	43	2.0	9	.4	—	—	—	—	
Other specified field	132	66	.2	16	.8	33	1.7	17	10.7	—	—	
Field not reported	107	91	.3	10	.5	4	.2	2	1.3	—	—	

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A69
Registered Nurses, Employed in Nursing, Classified by Type of Position and Marital Status, 1967

Marital status	Number of nurses by type of position							
	Total number	Director or assistant	Supervisor or assistant	Instructor	Head nurse or assistant	General duty or staff nurse	Other specified position	Position not reported
Totals, number	37,018	762	2,327	1,231	3,807	26,966	1,767	158
per cent	100.0	2.1	6.3	3.3	10.3	72.8	4.8	.4
Single	13,644	433	935	604	1,500	9,393	727	52
Married	21,278	253	1,150	570	2,000	16,381	839	85
Other specified status	2,091	76	242	57	307	1,187	201	21
Marital status not reported	5	—	—	—	—	5	—	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A70
Registered Nurses, Employed in Nursing, Classified by Type of Position and Sex, Ontario, 1967

Sex	Number of nurses by type of position							
	Total number	Director or assistant	Supervisor or assistant	Instructor	Head nurse or assistant	General duty or staff nurse	Other specified position	Position not reported
Totals, number	37,018	762	2,327	1,231	3,807	26,966	1,767	158
per cent	100.0	2.1	6.3	3.3	10.3	72.8	4.8	.4
Female	36,697	748	2,288	1,217	3,759	26,770	1,757	158
Male	318	14	39	14	48	193	10	—
Sex not reported	3	—	—	—	—	3	—	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A71
Registered Nurses, Employed in Nursing, Classified by Type of Position and Highest Level of Educational Preparation, Ontario, 1967

Type of position	Highest level of educational preparation											
	Total number	Diploma program leading to R.N.		Some post-basic credits towards a baccalaureate degree		Baccalaureate degree		Master's degree		Doctorate		
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Totals	37,018	32,754	100.0	2,088	100.0	2,012	100.0	158	100.0	6	100.0	
Director or assistant	762	435	1.3	91	4.4	180	8.9	52	32.9	4	66.6	
Supervisor or assistant	2,327	1,908	5.8	249	11.9	163	8.1	7	4.5	—	—	
Instructor	1,231	509	1.6	241	11.5	428	21.3	52	32.9	1	16.7	
Head nurse or assistant	3,807	3,461	10.6	222	10.6	123	6.1	1	.6	—	—	
General duty or staff nurse	26,966	24,745	75.5	1,183	56.7	1,025	51.0	13	8.2	—	—	
Other specified position	1,767	1,570	4.8	82	3.9	87	4.3	28	17.7	—	—	
Position not reported	158	126	.4	20	1.0	6	.3	5	3.2	1	16.7	

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A72
Registered Nurses, Employed in Nursing, Classified by Type of Position and Age Group, Ontario, 1967

Age group	Number of nurses by type of position							
	Total number	Director or assistant	Supervisor or assistant	Instructor	Head nurse or assistant	General duty or staff nurse	Other specified position	Position not reported
Totals, number	37,018	762	2,327	1,231	3,807	26,966	1,767	158
per cent	100.0	2.1	6.3	3.3	10.3	72.8	4.8	.4
24 and under	5,875	3	43	128	167	5,472	57	5
25-29	8,367	23	202	388	742	6,785	199	28
30-34	5,067	64	237	237	570	3,775	170	14
35-39	4,016	96	296	143	476	2,824	163	18
40-44	3,200	105	281	101	406	2,124	171	12
45-49	2,979	127	351	76	445	1,775	181	24
50-54	2,541	128	340	65	357	1,440	202	9
55-59	2,086	112	288	44	321	1,116	194	11
60 and over	1,873	85	234	26	229	919	355	25
Age not reported	1,014	19	55	23	94	736	75	12

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A73
Registered Nurses, Employed in Nursing, Classified by Highest Level of Educational Preparation and Age Group, Ontario, 1967

Age group	Highest level of educational preparation											
	Total number	Diploma program leading to R.N.		Some post-basic credits towards a baccalaureate degree		Baccalaureate degree		Master's degree		Doctorate		
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Totals	37,018	32,754	100.0	2,088	100.0	2,012	100.0	158	100.0	6	100.0	
24 and under	5,875	5,400	16.5	234	11.2	240	11.9	1	.6	—	—	
25-29	8,367	7,072	21.6	621	29.7	668	33.2	6	3.8	—	—	
30-34	5,067	4,366	13.3	328	15.7	353	17.6	20	12.7	—	—	
35-39	4,016	3,518	10.7	258	12.4	222	11.0	18	11.4	—	—	
40-44	3,200	2,801	8.6	204	9.8	176	8.8	17	10.7	2	33.3	
45-49	2,979	2,654	8.1	178	8.5	113	5.6	32	20.3	2	33.3	
50-54	2,541	2,301	7.0	113	5.4	92	4.6	34	21.5	1	16.7	
55-59	2,086	1,955	6.0	61	2.9	57	2.8	12	7.6	1	16.7	
60 and over	1,873	1,784	5.4	41	2.0	34	1.7	14	8.9	—	—	
Age not reported	1,014	903	2.8	50	2.4	57	2.8	4	2.5	—	—	

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A75

Registered Nurses, Classified by Highest Level of Educational Preparation and Employment Status, Ontario, 1967

Highest level of educational preparation	Total number	Employment status							
		Full time in nursing		Part time in nursing		Not employed in nursing		Employment status not reported	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Totals	54,492	25,737	100.0	11,281	100.0	14,164	100.0	3,310	100.0
Diploma program leading to R.N.	44,936	20,013	77.8	10,119	89.7	11,728	82.8	3,076	92.9
University diploma/certificate which carries no credits towards a baccalaureate degree	3,632	2,137	8.3	485	4.3	913	6.4	97	2.9
Some post-basic credits towards baccalaureate degree	3,037	1,670	6.5	418	3.7	873	6.2	76	2.3
Baccalaureate degree:									
Basic baccalaureate in nursing	1,540	975	3.8	158	1.4	378	2.7	29	.9
Post-basic baccalaureate in nursing	871	655	2.5	36	.3	163	1.2	17	.5
Baccalaureate—other than nursing	280	140	.5	48	.4	83	.6	9	.3
Master's degree:									
Major in nursing	134	116	.5	8	.1	7	.0	3	.1
Major in other than nursing	54	26	.1	8	.1	17	.1	3	.1
Doctorate:									
Major in nursing	3	2	—	—	—	1	—	—	—
Major in other than nursing	5	3	—	1	—	1	—	—	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A76
Registered Nurses, Classified by Employment Status and Age Group, Ontario, 1967

Age group	Total number	Employment status					
		Full time in nursing		Part time in nursing		Not employed in nursing	
		Number	Per cent	Number	Per cent	Number	Per cent
Totals	54,492	25,737	100.0	11,281	100.0	14,164	100.0
24 and under	6,667	5,249	20.4	626	5.5	743	5.2
25-29	11,151	6,011	23.3	2,356	20.9	2,644	18.7
30-34	8,052	2,997	11.6	2,070	18.4	2,833	20.0
35-39	6,507	2,311	9.0	1,705	15.1	2,329	16.5
40-44	4,945	1,903	7.4	1,297	11.5	1,599	11.3
45-49	4,343	1,952	7.6	1,027	9.1	1,198	8.5
50-54	3,582	1,819	7.1	722	6.4	855	6.0
55-59	3,003	1,535	6.0	551	4.9	696	4.9
60 and over	3,121	1,248	4.8	625	5.5	913	6.4
Age not reported	3,121	712	2.8	302	2.7	354	2.5
						1,753	53.0

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A77
Registered Nurses, Classified by Employment Status and Marital Status, Ontario, 1967

Marital status	Total number	Employment status					
		Full time in nursing		Part time in nursing		Not employed in nursing	
		Number	Per cent	Number	Per cent	Number	Per cent
Totals	54,492	25,737	100.0	11,281	100.0	14,164	100.0
Single	16,100	12,949	50.3	695	6.2	1,448	10.2
Married	35,631	11,076	43.0	10,202	90.4	12,281	86.7
Other specified status	2,737	1,709	6.7	382	3.4	434	3.1
Marital status not reported	24	3	—	2	—	1	—
						18	.5

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A78**Registered Nurses, Employed in Nursing, Classified by Type of Position and Employment Status, Ontario, 1967**

Type of position	Total number	Employment status			
		Full time in nursing		Part time in nursing	
		Number	Per cent	Number	Per cent
Totals	37,018	25,737	100.0	11,281	100.0
Director or assistant	762	736	2.9	26	.2
Supervisor or assistant	2,327	2,057	8.0	270	2.4
Instructor	1,231	1,131	4.4	100	.9
Head nurse or assistant	3,807	3,575	13.9	232	2.1
General duty or staff nurse	26,966	17,203	66.8	9,763	86.6
Other specified position	1,767	939	3.6	828	7.3
Position not reported	158	96	.4	62	.5

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A79**Registered Nurses, Classified by Residence and Employment Status, 1967**

Employment status	Total number	Resident in Ontario	Resident in another part of Canada	Resident abroad	Residence not reported
Totals	54,492	49,311	2,532	2,647	2
Employed in nursing	37,018	34,050	1,486	1,480	2
Not employed in nursing	14,164	12,310	870	984	—
Employment status not reported	3,310	2,951	176	183	—

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A80**Nurses Registered in Ontario, Classified by Current Provincial Registration, 1967**

Registered	Number
Totals	54,492
In Ontario only	50,232
In Ontario and one other province	3,754
In Ontario and two other provinces	441
In Ontario and three other provinces	65

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A81**Professional Nurses, Registered and Employed in Ontario,¹ by Field of Employment and Employment Status, 1967**

Field of employment	Total number	Employment status			
		Full time in nursing		Part time in nursing	
		Number	Per cent	Number	Per cent
Total	33,877	23,304	100.0	10,573	100.0
Hospital or other institution	27,189	18,420	79.0	8,769	82.9
School of nursing	1,275	1,177	5.1	98	.9
Private practice	1,298	564	2.4	734	7.0
Public health (other than school health)	1,968	1,670	7.2	298	2.8
School health	256	143	.6	113	1.1
Occupational health	760	631	2.7	129	1.2
Office (physician or dentist)	947	576	2.5	371	3.5
Other specified field	95	82	.3	13	.1
Field not reported	89	41	.2	48	.5

¹Does not include nurses registered in Ontario and employed in other provinces or outside Canada.

SOURCE: Research Unit, Canadian Nurses' Association, 1968.

TABLE A82**Ratio of Nurses Registered as Active or Practising to Population in Ontario and Canada, 1960-1965**

Year	Ontario	Canada
1967	1:131	1:173
1966	1:137	1:182
1965	1:139	1:188
1964	1:173	1:220
1963	1:191	1:237
1962	1:192	1:246
1961	1:201	1:258
1960	1:212	1:271

SOURCE: Canadian Nurses' Association, *Countdown 1968: Canadian Nursing Statistics*, Ottawa, 1968, p. 63.

Nursing Assistants

In 1965, according to the College of Nurses of Ontario, there were 10,959 registered nursing assistants in Ontario, of whom 10,455 were resident in Ontario and 7,865 were practising. According to Helen K. Mussallem in *Manpower Problems in the Nursing Profession* there are many nursing assistants practising who are not licensed. In 1965 the Ontario Association of Registered Nursing Assistants had 1,655 members and they claimed that this was approximately 15 per cent of those practising. This means there are about 11,033 practising. Also, the Association says 95 per cent of these nursing assistants work in public general hospitals. We might conclude that there were about 11,000 nursing assistants practising in Ontario in 1965 and that 7,865 of these were registered.

The Canadian Nurses' Association gives the following figures for 1966 for Ontario.

Number registered and practising		
Full time	7,816	
Part time	1,614	
		9,430
Number not practising		2,376
Employment status not reported		417
Total number registered		12,223

Again, however, more practise than are registered: probably about 12,500 or 13,000.

According to the College of Nurses of Ontario, there were 12,398 registered nursing assistants in Ontario in 1967.

TABLE A83
Registered Nursing Assistants in Ontario, 1950-1968

Year	Number
1950	471
1959	4,840
1960	3,532
1965	10,959
1966	12,223
1967	14,011
1968	14,907

SOURCE: Ontario College of Nurses.

TABLE A84

**Number of Nurses in the Victorian Order of Nurses in Ontario, by Qualifications,
September 1968**

Qualification	Number	Per cent
Public health nurses	231	61
Master's degree	3	
Basic degree (including admin. and supervision)	10	
Administration and supervision certificate	15	
Basic degree (including public health nursing)	53	
Post basic degree (including public health nursing)	20	
Public health nursing certificate	130	
Registered nurses	139	36
Registered nursing assistants	11	3
Total	381	100

SOURCE: Victorian Order of Nurses.

TABLE A85

Registered Nursing Assistants, Employed in Nursing, Classified by Field of
Employment and Age Group, Ontario, 1967

Age group	Number of nursing assistants by field of employment								
	Total number	Hospital	Nursing home	Private nursing	Public health	Occupational health	Office nursing	Other specified field	Field not reported
Totals, number	10,150	9,190	259	157	50	35	184	204	71
per cent	100.0	90.2	2.6	1.6	.5	.4	1.8	2.1	.8
20 and under	533	514	.6	—	1	—	2	10	—
20-24	3,092	2,901	42	14	17	2	69	39	8
25-29	1,424	1,285	36	14	7	3	38	30	11
30-34	806	707	32	8	1	4	26	15	13
35-39	697	615	18	11	—	4	17	13	19
40-44	724	630	29	14	7	5	12	27	—
45-49	775	683	23	17	4	7	12	20	9
50-54	728	641	17	26	5	5	8	25	1
55-59	454	395	17	23	3	1	—	14	1
60 and over	389	319	23	24	3	2	—	11	7
Age not reported	528	500	16	6	2	2	—	—	2

SOURCE: See Table A63.

TABLE A86
Registered Nursing Assistants, Employed in Nursing, Classified by Field of Employment and Marital Status, Ontario, 1967

Marital status	Number of nursing assistants by field of employment							
	Total number	Hospital	Nursing home	Private nursing	Public health	Occupational health	Office nursing	Other specified field
Totals, number	10,150	9,190	259	157	50	35	184	204
per cent	100.0	90.2	2.6	1.6	.5	.4	1.8	2.1
Single	4,174	3,862	86	52	12	1	48	108
Married	5,054	4,549	129	87	36	19	136	90
Other specified status	882	779	44	18	2	15	—	5
Marital status not reported	40	—	—	—	—	—	—	1
								39

SOURCE: See Table A63.

TABLE A87
Registered Nursing Assistants, Employed in Nursing, Classified by Field of Employment and Sex, Ontario, 1967

Sex	Number of nursing assistants by field of employment							
	Total number	Hospital	Nursing home	Private nursing	Public health	Occupational health	Office nursing	Other specified field
Totals, number	10,150	9,190	259	157	50	35	184	204
per cent	100.0	90.2	2.6	1.6	.5	.4	1.8	2.1
Female	10,006	9,063	254	157	49	34	184	200
Male	144	127	5	—	1	1	—	4
								6

SOURCE: See Table A63.

TABLE A88
Registered Nursing Assistants, Employed in Nursing, Classified by Field of
Employment and Employment Status, Ontario, 1967

Field of employment	Total number	Employment status					
		Full time in nursing		Part time in nursing		Employment status not reported	
		Number	Per cent	Number	Per cent	Number	Per cent
Totals	10,890	8,348	100.0	1,802	100.0	740	100.0
Hospital	9,208	7,668	91.9	1,522	84.5	18	2.4
Nursing home	259	198	2.4	61	3.4	—	—
Private nursing	159	70	.8	87	4.8	2	.3
Public health	51	36	.4	14	.8	1	.1
Occupational health	36	34	.4	1	—	1	.1
Office nursing	186	139	1.7	45	2.5	2	.3
Other specified field	209	163	1.9	41	2.3	5	.7
Field not reported	782	40	.5	31	1.7	711	96.1

SOURCE: See Table A63.

TABLE A89
Registered Nursing Assistants, Employed in Nursing, Classified by Highest Level
of Education Preparation and Age Group, Ontario, 1967

Age group	Total no.	Highest grade obtained in school												Other specified preparation	Preparation not reported		
		Grade 7		Grade 8		Grade 9		Grade 10		Grade 11		Grade 12					
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent				
Totals	10,150	74	100.0	984	100.0	1,035	100.0	3,447	100.0	1,988	100.0	1,970	100.0	385	100.0	267	100.0
20 and under	533	2	2.7	4	.4	5	.5	183	5.3	144	7.2	188	9.5	5	1.3	2	.7
20-24	3,092	1	1.4	38	3.9	168	16.2	1,264	36.7	792	40.0	775	39.3	44	11.4	10	3.8
25-29	1,424	12	16.2	102	10.4	220	21.3	511	14.8	266	13.3	238	12.1	57	14.8	18	6.8
30-34	806	9	12.2	96	9.6	145	14.0	250	7.3	132	6.6	130	6.6	20	5.2	24	9.0
35-39	697	4	5.4	94	9.6	84	8.1	241	7.0	107	5.4	105	5.4	38	9.9	24	9.0
40-44	724	13	17.5	130	13.2	88	8.5	206	6.0	119	6.0	94	4.7	45	11.7	29	10.9
45-49	775	7	9.5	141	14.3	106	10.2	193	5.6	119	6.0	139	7.1	47	12.2	23	8.6
50-54	728	6	8.1	138	14.0	73	7.1	231	6.7	108	5.4	111	5.6	35	9.1	26	9.7
55-59	454	7	9.5	98	10.0	56	5.4	120	3.4	62	3.1	59	3.0	30	7.8	22	8.2
60 and over	389	13	17.5	90	9.2	38	3.7	66	1.9	49	2.5	57	2.9	40	10.4	36	13.5
Age not reported	528	—	—	53	5.4	52	5.0	182	5.3	90	4.5	74	3.8	24	6.2	53	19.8

SOURCE: See Table A63.

TABLE A90
Registered Nursing Assistants, Not Employed in Nursing, Classified by Highest
Level of Education Preparation and Age Group, Ontario, 1967

Age group	Total number	Highest grade obtained in school												Other specified preparation	Preparation not reported		
		Grade 7		Grade 8		Grade 9		Grade 10		Grade 11		Grade 12					
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent				
Totals	3,496	11	100.0	347	100.0	375	100.0	1,017	100.0	504	100.0	538	100.0	132	100.0	572	10
20 and under	26	—	—	—	—	—	—	6	.6	5	.6	14	2.6	—	—	1	—
20-24	731	1	9.1	16	4.6	85	22.7	278	27.3	160	31.7	164	30.5	16	12.1	11	1
25-29	745	1	9.1	59	17.0	123	32.8	273	26.8	121	24.0	127	23.6	26	19.7	15	2
30-34	401	1	9.1	65	18.7	50	13.4	133	13.1	55	10.9	66	12.3	18	13.6	13	2
35-39	285	1	9.1	53	15.3	35	9.4	82	8.1	50	9.9	36	6.7	12	9.1	16	2
40-44	203	—	—	44	12.7	23	6.1	57	5.6	26	5.2	29	5.4	11	8.3	13	2
45-49	169	1	9.1	32	9.2	17	4.5	47	4.6	24	4.8	23	4.3	13	9.8	12	2
50-54	156	2	18.2	26	7.5	8	2.1	39	3.8	25	4.9	29	5.4	12	9.1	15	2
55-59	85	—	—	16	4.6	5	1.3	21	2.1	10	2.0	11	2.0	8	6.1	14	2
60 and over	88	3	27.2	20	5.8	6	1.6	14	1.4	6	1.2	11	2.0	8	6.1	20	3
Age not reported	607	1	9.1	16	4.6	23	6.1	67	6.6	22	4.4	28	5.2	8	6.1	442	7

SOURCE: See Table A63.

TABLE A91
**Registered Nursing Assistants, Employed in Nursing, Classified by Field of
 Employment and Highest Level of Education, Ontario, 1967**

Field of employment	Highest grade obtained in school								
	Total number	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	Other specified preparation	Preparation not reported
Totals	10,150	74	984	1,035	3,447	1,988	1,970	385	267
Hospital	9,190	71	864	927	3,130	1,836	1,785	349	228
Nursing home	259	—	28	36	81	38	54	13	9
Private nursing	157	—	33	21	41	26	26	7	3
Public health	50	—	10	6	16	10	8	—	—
Occupational health	35	—	3	3	9	9	8	3	—
Office nursing	184	1	14	14	73	33	45	3	1
Other specified field	204	—	28	21	74	27	39	7	8
Field not reported	71	2	4	7	23	9	5	3	18

SOURCE: See Table A63.

TABLE A92
Registered Nursing Assistants, Classified by Employment Status and Age Group,
Ontario, 1967

Age group	Total number	Employment status							
		Full time in nursing Number	Per cent	Part time in nursing Number	Per cent	Not employed in nursing Number	Per cent	Employment status not reported Number	Per cent
Totals	13,646	8,348	100.0	1,802	100.0	2,756	100.0	740	100.0
20 and under	559	524	6.3	11	.6	21	.8	3	.4
20-24	3,823	2,767	33.1	329	18.3	687	24.9	40	5.4
25-29	2,169	1,025	12.3	401	22.3	702	25.4	41	5.5
30-34	1,207	549	6.6	253	14.0	380	13.8	25	3.4
35-39	982	492	5.9	206	11.4	254	9.2	30	4.1
40-44	927	567	6.8	159	8.8	179	6.5	22	2.9
45-49	944	661	7.9	110	6.1	140	5.1	33	4.5
50-54	884	607	7.3	122	6.8	127	4.6	28	3.8
55-59	539	392	4.7	60	3.3	58	2.1	29	3.9
60 and over	477	319	3.8	65	3.6	63	2.3	30	4.1
Age not reported	1,135	445	5.3	86	4.8	145	5.3	459	62.0

SOURCE: See Table A63.

TABLE A93
Registered Nursing Assistants, Classified by Employment Status and
Marital Status, Ontario, 1967

Marital status	Total number	Employment status					
		Full time in nursing		Part time in nursing		Not employed in nursing	
		Number	Per cent	Number	Per cent	Number	Per cent
Totals	13,646	8,348	100.0	1,802	100.0	2,756	100.0
Single	4,673	3,845	46.0	75	4.1	568	20.6
Married	7,817	3,611	43.3	1,654	91.7	2,113	76.8
Other specified status	1,055	891	10.7	73	4.2	73	2.6
Marital status not reported	101	1	—	—	—	2	—
						98	13.3

SOURCE: See Table A63.

TABLE A94
Registered Nursing Assistants, Classified by Age Group, Marital Status and
Employment Status, Ontario, 1967

Marital status	Total number	Total per cent	Percentage of nursing assistants by age group										Age not reported
			20 and under	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 and over	
Totals, number	13,646	—	559	3,823	2,169	1,207	982	927	944	884	539	477	1,135
per cent	—	100.0	4.1	28.0	15.9	8.8	7.2	6.8	6.9	6.5	4.0	3.5	8.3
Single:													
employed	3,920	28.7	494	2,138	294	205	154	105	95	101	72	98	164
not employed	568	4.2	18	132	39	38	29	33	54	41	51	49	84
unknown	185	1.4	1	8	3	3	4	5	—	2	—	2	157
Married:													
employed	5,265	38.6	39	939	1,088	554	505	534	525	458	198	123	302
not employed	2,113	15.5	3	555	661	338	217	134	69	75	1	8	52
unknown	439	3.2	2	32	37	20	26	13	31	26	24	20	208
Other specified status:													
employed	964	7.1	2	18	44	43	39	87	151	170	182	163	65
not employed	73	.5	—	—	2	4	8	12	17	11	6	5	8
unknown	18	.1	—	—	—	—	—	—	2	—	—	8	8
Unknown:													
employed	1	—	—	1	—	—	—	—	—	—	—	—	—
not employed	2	—	—	—	—	—	—	—	—	—	—	1	1
unknown	98	.7	—	—	1	2	—	4	—	—	5	—	88

SOURCE: See Table A63.

TABLE A95
Nursing Regions (Electoral Regions) of Ontario, 1967

Region 1:	Counties of Essex, Kent, Elgin, Lambton and Middlesex.
Region 2:	Counties of Huron, Perth, Oxford, Brant and Norfolk.
Region 3:	Counties of Bruce, Grey, Dufferin, Wellington and Waterloo.
Region 4:	Counties of Haldimand, Lincoln, Welland, Wentworth and Halton.
Region 5:	Counties of Peel, York and Ontario.
Region 6:	Counties of Victoria, Peterborough, Durham, Northumberland, Prince Edward, Hastings and Haliburton.
Region 7:	Counties of Frontenac, Leeds, Grenville, Lanark, Lennox and Addington.
Region 8:	Counties of Carleton, Russell, Prescott, Glengarry, Stormont, Dundas and Renfrew.
Region 9:	Manitoulin Island, and the Districts of Algoma, Sudbury, Nipissing, and of Parry Sound north of the southern border of Georgian Bay Provincial Forest and the road through Dunchurch and Sundridge.
Region 10:	Districts of Kenora, Rainy River, Thunder Bay and Patricia.
Region 11:	Simcoe County and the Districts of Muskoka and of Parry Sound south of the southern border of Georgian Bay Provincial Forest and the road through Dunchurch and Sundridge.
Region 12:	Districts of Temiskaming and Cochrane.

SOURCE: College of Nurses of Ontario, mimeographed material.

TABLE A96
Registered Nurses and Registered Nursing Assistants in Ontario, by Region, May 13, 1967

	Registered nurses	Registered nursing assistants
Region 1	6,472	1,519
Region 2	2,141	734
Region 3	2,900	621
Region 4	5,654	1,750
Region 5	15,348	3,164
Region 6	2,134	497
Region 7	2,131	449
Region 8	4,509	815
Region 9	1,987	794
Region 10	1,304	735
Region 11	1,269	349
Region 12	675	312
Out of province	4,908	659
	51,432	12,398

SOURCE: College of Nurses of Ontario, mimeographed material.

Nursing Specialties

The psychiatric nurse has accepted status in British Columbia, Alberta, Saskatchewan and Manitoba only. The position requires basic nursing training first.

An operating room technician is a person whom doctors now accept as needed. The demand exceeds the supply in this field. The only school in Canada is in Winnipeg. A six-month course (after regular nursing training) is given for ten students each year.

Midwives are necessary only for the north or on missions. There are enough of these and the schools currently are not being used to capacity. The course takes twenty-one weeks, after a registered nursing program. The two schools in Canada are at the Alberta School of Nursing and at Laval.

Training and Education

Nurses

To have proper teaching, the Registered Nurses' Association of Ontario advises a ratio of university graduates to diploma graduates of 1:4. The Canadian Nurses' Association advises 1:3. Of the 1965 graduates, the observed ratio was 1:11, and of all the nurses now registered in Ontario it is 1:28. The enrolment of nursing students in Ontario university schools increased by 60 per cent over 1961-1966, but this is a decrease to 3.9 per cent of the total number of nursing students.⁸

TABLE A97
Enrolment in Schools of Nursing, Ontario, 1968

	Year 1	Year 2	Year 3	Year 4	Unclassi- fied	Total
1. Barrie, Royal Victoria Regional School	73	50	42	—	1	166
2. Belleville, Belleville General Hospital (phasing out 1970)	—	25	19	—	2	46
3. Belleville, Edith Cavell Regional School	—	—	—	—	—	—
4. Brantford, Brantford General Hospital	38	34	47	—	1	120
5. Brockville, General Hospital (phasing out)	—	27	24	—	1	52
6. Brockville, Regional School	59	—	—	—	—	59
7. Brockville, Ontario Hospital	25	14	28	—	—	67
8. Chatham, Public General	50	37	34	—	2	123
9. Chatham, St. Joseph's (phasing out 1970)	—	20	28	—	3	51

SOURCE: College of Nurses of Ontario.

⁸Registered Nurses' Association of Ontario, Brief to the Committee on the Healing Arts, p. 18.

TABLE A97 (Continued)
Enrolment in Schools of Nursing, Ontario, 1968

	Year 1	Year 2	Year 3	Year 4	Unclassi- fied	Total
10. Cooksville, Credit Valley Regional	59	—	—	—	—	59
11. Cornwall, Cornwall Regional School	90	81	—	—	—	171
12. Cornwall, Cornwall General Hospital (phasing out 1969)	—	—	37	—	5	42
13. Cornwall, Hotel Dieu Hospital (phasing out 1969)	—	—	38	—	—	38
14. Fort William, McKellar General Hospital	48	45	46	—	4	143
15. Galt, South Waterloo Memorial Hospital	38	28	23	—	—	89
16. Guelph, General Hospital	39	25	38	—	2	104
17. Guelph, St. Joseph's Hospital	51	34	28	—	3	116
18. Hamilton, Hamilton Civic Hospitals	114	72	93	—	—	279
19. Hamilton, Hamilton and District	77	64	—	—	1	142
20. Hamilton, McMaster University	29	26	28	28	—	111
21. Hamilton, St. Joseph's	113	94	120	—	17	344
22. Kingston, Kingston General	100	66	73	—	2	241
23. Kingston, Ontario Hospital	29	33	30	—	—	92
24. Kingston, Queen's University	—	—	—	—	—	—
25. Kingston, St. Joseph's Hotel Dieu	68	57	57	—	3	185
26. Kitchener, Kitchener-Waterloo Hospital	63	57	56	—	—	176
27. Kitchener, St. Mary's	65	39	44	—	5	153
28. London, St. Joseph's Hospital (phasing out 1969)	—	—	54	—	1	55
29. London, St. Joseph's Regional School	75	61	—	—	—	136
30. London, University of Western Ontario	40	27	19	—	—	86
31. London, Victoria Hospital	138	123	112	—	1	374
32. Niagara Falls, Greater Niagara General Hospital	41	39	31	—	1	112
33. North Bay, St. Joseph's School of Nursing	53	42	34	—	7	136
34. Orillia, Soldiers' Memorial Hospital	37	30	17	—	—	84
35. Oshawa, Oshawa General Hospital	58	37	37	—	5	137
36. Ottawa, Ottawa Civic Hospital	178	147	168	—	2	495
37. Ottawa, Ottawa General Hospital	70	54	56	10	2	192
38. Ottawa, St. Louis Marie de Montfort	35	16	19	—	—	70

SOURCE: College of Nurses of Ontario.

TABLE A97 (Continued)
Enrolment in Schools of Nursing, Ontario, 1968

	Year 1	Year 2	Year 3	Year 4	Unclassi- fied	Total
39. Ottawa, Ottawa University	27	21	8	1	—	57
40. Ottawa, Vanier Regional School	—	—	—	—	—	—
41. Owen Sound, Regional School	75	—	—	—	—	75
42. Pembroke, Lorrain School of Nursing	34	23	28	—	—	85
43. Peterborough, Peterborough Civic Hospital	42	44	49	—	1	136
44. Peterborough, St. Joseph's School of Nursing	35	28	26	—	2	91
45. Port Arthur, Lakehead Regional School of Nursing	69	—	—	—	—	69
46. Port Arthur, Lakehead University	21	15	12	—	—	48
47. Port Arthur, The General Hospital (phasing out 1970)	—	40	31	—	—	71
48. Port Arthur, St. Joseph's Hospital (phasing out 1970)	—	29	26	—	—	55
49. St. Catharines, The Mack School of Nursing	96	81	—	—	—	177
50. St. Catharines, The Mack Training School (phasing out 1969)	—	59	9	—	—	68
51. St. Thomas, St. Thomas Elgin General Hospital	41	39	51	—	—	131
52. Sarnia, Sarnia General Hospital (phasing out 1969)	—	—	22	—	—	22
53. Sarnia, St. Clair Regional School of Nursing	39	16	—	—	—	55
54. Sault Ste. Marie, Algoma Regional School of Nursing	—	—	—	—	—	—
55. Sault Ste. Marie, Plummer Memorial Public Hospital	31	23	27	—	2	83
56. Sault Ste. Marie, St. Mary's, Sault Ste. Marie General	45	33	34	—	3	115
57. Stratford, Perth Huron Regional School	—	—	—	—	—	—
58. Stratford, Stratford General Hospital	33	28	18	—	—	79
59. Sudbury, Laurentian University	16	14	—	—	—	30
60. Sudbury, Marymount School (phasing out 1969)	—	—	28	—	—	28

SOURCE: College of Nurses of Ontario.

TABLE A97 (Continued)
Enrolment in Schools of Nursing, Ontario, 1968

	Year 1	Year 2	Year 3	Year 4	Unclassi- fied	Total
61. Sudbury, St. Elizabeth's School (phasing out 1969)	—	—	38	—	—	38
62. Sudbury, Sudbury Regional School of Nursing	54	42	—	—	—	96
63. Timmins, St. Mary's (phasing out 1970)	—	26	24	—	—	50
64. Timmins, Timmins District School	—	—	—	—	—	—
65. Toronto, Toronto East General and Orthopaedic Hospital	68	51	55	—	—	174
66. Toronto, Toronto General Hospital	130	94	99	—	—	323
67. Toronto, Hospital for Sick Children	67	70	56	—	3	196
68. Toronto, Nightingale School	64	55	—	—	—	199
69. Toronto, North York Branson General Hospital	25	24	21	—	8	78
70. Toronto, Osler School	75	42	29	—	—	146
71. Toronto, Quo Vadis School	51	36	—	—	4	91
72. Toronto, Ryerson Polytechnical Institute	37	29	29	—	—	95
73. Toronto, Seneca College	—	—	—	—	—	—
74. Toronto, St. Joseph's School	113	85	72	—	2	272
75. Toronto, St. Michael's Hospital	124	79	102	19	2	326
76. Toronto, Scarborough Regional	62	35	—	—	—	97
77. Toronto, University of Toronto	78	71	61	61	—	271
78. Toronto, Wellesley Hospital	85	61	80	—	1	227
79. Toronto, Toronto Western Hospital	122	102	114	—	—	338
80. Toronto, Women's College Hospital	42	29	—	—	—	71
81. Toronto, York Regional School	70	64	—	—	—	134
82. Whitby, The Ontario Hospital	26	21	20	—	—	67
83. Windsor, Hotel Dieu	73	70	71	—	—	214
84. Windsor, Metropolitan General	23	23	25	—	—	71
85. Windsor, Grace Hospital	49	42	31	—	3	125
86. Windsor, University of Windsor	18	—	—	—	—	18
87. Woodstock, Woodstock General Hospital	51	42	44	—	—	137
Totals	4,064	3,190	2,820	119	102	10,295

In addition, 3 new schools enrolled in October, 1968

Belleville, Edith Cavell 40

Kirkland Lake Regional 28

Timmins District 31

99

SOURCE: College of Nurses of Ontario.

TABLE A98

Number of Graduates and Staff of Some of the Nursing Schools of Ontario, 1967

School	Number of graduates, 1966	Other information
University of Toronto School of Nursing	227	By 1971 — 250 grads. 1965-1966: 12 hospitals and 4 other health agencies were used for clinical experience. Faculty: 1 professor 5 associate professors 10 assistant professors 4 lecturers 20 total staff
School of Nursing and Health Science, McMaster	19	By 1971 — 24 grads.
School of Nursing University of Windsor	8 67	B.Sc.N. Diploma grads. Faculty — 5.
University of Western Ontario School of Nursing	—	Yet to have grads. 4-yr. Undergrad. course. 25 (out of 195 applicants) have enrolled. Staff: 12-40 in next 2 years.
Nightingale School of Nursing	52	128 students in all (2-year diploma course). Teaching staff — 13.
Quo Vadis School of Nursing	—	No grads. yet. 2-year diploma. Faculty — 12.
Ryerson Polytechnical Institute — School of Nursing	9 35	1967 (first class) 3-yr. diploma course by 1971 — 33 grads. Grads. in public health inspection course.
Hospital for Sick Children — School of Nursing		175 students. 36 full-time teachers.
Ontario Hospital School of Nursing, Kingston		1966 — 80 students. By 1971 — 138 students. Faculty — 18. 3-yr. diploma course.

SOURCE: Canadian Nurses' Association, Brief to the Committee on the Healing Arts.

TABLE A99**Nursing Students in Ontario in the Higher Levels of Nursing Education, 1961**

B.Sc. N.	401
Postgraduates in administration or teaching	91
Post-diploma courses (public health, clinical specialties, etc.)	449

SOURCE: Registered Nurses' Association of Ontario, Brief to the Committee on the Healing Arts; see also the Royal Commission on Health Services, Vol. I, Queen's Printer, Ottawa, 1964.

TABLE A100**Qualifications of Teachers of Nurses, Ontario, 1965**

Percentage of those teaching	Qualification
36	Nothing beyond a diploma.
32	Some training towards a degree.
31	B.Sc.N. or higher.

SOURCE: Registered Nurses' Association of Ontario, Brief to the Committee on the Healing Arts, p. 9.

TABLE A101**Qualifications of Teachers of Nurses by Type of Program Taught, Ontario, 1965**

	Percentage	Qualification
University schools ¹	40	B.Sc.N.
	56	Master's or higher
Diploma programs ²	20	Diploma only
	44	Diploma with 1-year teacher's certificate
	32	B.Sc.N.
	4	Master's degree

¹169 teachers

²921 teachers

full time 859

part time 62

62 diploma programs

8,355 students

SOURCE: University of Toronto School of Nursing, Brief to the Committee on the Healing Arts.

TABLE A102**Reasons for Not Admitting Optimum Number of Students in Nursing Schools, Ontario, 1962**

	<u>No. of schools</u>
Academic requirements not met	13
Insufficient applicants	12
Insufficient instructors	1
Insufficient residence accommodation	10
Insufficient classroom accommodation	5
Insufficient clinical experience	4

SOURCE: Helen K. Mussallem, *Nursing Education in Canada*, 1964, p. 58.

TABLE A103**Policies Regarding Nurses' Residences in Ontario, 1961**

	<u>No. of schools</u>
Must live in	36
Live out if married	7
Live out if in senior year	6
Live out if in last 2 years	2
Live out	6
No rules	4

SOURCE: Helen K. Mussallem, *Nursing Education in Canada*, 1964, p. 72.

Nursing Assistants

There are forty-nine training centres for nursing assistants approved by the College of Nurses of Ontario. There are no tuition fees paid for any of these. Thirty-two of the centres are in public hospitals, eleven are in vocational schools, and six are operated by the Ontario Department of Health.

Over 500 graduate from the six Department of Health schools each year. In 1964 they admitted 631 and in 1965, 635. In 1969 they were enrolled at capacity. The Canadian Mothercraft Society operates a one-year program, and in 1965 twenty-five certificates were awarded.

The Committee for the Survey of Hospital Needs in Metropolitan Toronto has estimated that by 1970, 3,154 nursing assistants will be needed in Metro Toronto, and by 1980, 3,735 will be needed.

TABLE A104
Nursing Assistants in Ontario: the Number Graduating from Different Educational Settings, 1963-1968

Year	1963	1964	1965	1966	1967	1968
Hospital school grads.	633	613	669	654	702 ¹	—
Vocational school grads.	30	36	65	98	—	—
Dept. of Health prog. grads.	471	557	412	540	—	—
Total number of registered nursing assistants	1,134	1,206	1,146	1,292	1,388 ²	1,540 ²

¹Ontario Hospital Services Commission, *Annual Report (Statistical Supplement)*, 1967.

²Ontario College of Nurses.

SOURCE: Ontario Association of Registered Nursing Assistants, Brief to the Committee on the Healing Arts.

TABLE A105
Number Admitted to Educational Programs in Nursing in Ontario, 1967

Program	Number
B.Sc.N.	212 ¹
Diploma course	3,333
Nursing assistants	1,760
Total	5,305

¹We need 1,500 annually to achieve 1:3.

SOURCE: Canadian Nurses' Association, *Countdown 1968: Canadian Nursing Statistics*, Ottawa, 1968.

TABLE A106
Graduates in Nursing in Ontario, 1967

Program	Number graduated	Average per school
Nursing assistants	1,388	28
Registered nurses — diploma course	2,652	34

Source: See Table A105.

Pharmacists

The notes on pharmacists are divided into two sections: inventory and education. There then follows a section on pharmaceutical manufacturers.

Inventory

There has been a substantial increase in the number of prescriptions written and dispensed in Ontario. The number has increased by 72 per cent since 1956 and by

42 per cent since 1961.⁹ This trend is even greater in Essex county where the Green Shield Prepaid Prescription Plan has considerably increased demand.

The Ontario College of Pharmacy reported that 3,828 pharmacists were registered in Ontario in May 1960. But according to the 1961 census there were only 2,299 pharmacists in the province. We must assume that 1,529 of those on the Register were retired, or at least not practising.

Some people claim that there is no serious shortage of pharmacists in the retail or community pharmacy field. The number of pharmacies serving the public has decreased, however. Shortages exist in the areas of hospital pharmacy, in government departments (such as the Food and Drug Directorate), in the pharmaceutical industry, and in the teaching profession.

In Ontario in 1965, 35 per cent of the 179 hospitals had no full or part-time pharmacist. Although the Ontario Hospital Services Commission will support a full-time pharmacist for hospitals of over seventy-five beds and a part-time pharmacist for those with fewer beds, 71 per cent of the eighty-three hospitals of less than 100 beds did not have a pharmacist. In January 1967, the Canadian Society of Hospital Pharmacists, Ontario Branch, listed the following vacancies in Ontario hospitals: eleven vacancies for directors, four for assistant directors, and twenty-eight for staff pharmacists.¹⁰

As further evidence of the shortage in this area, the number of pharmacists employed in Ontario hospitals has grown from 229 to 290 since 1965. An insufficient number are moving to this area. The salaries for hospital pharmacists are lower than those of retail pharmacists. In Canada, as a whole, there are some 475 hospital pharmacists practising full time. John C. Turnbull (in his Brief, *Pharmaceutical Manpower in Canada*, to the Canadian Medical Association) estimates that Canada's hospitals and related institutions can use 2,000 pharmacists full time, plus the part-time services of 500 more.

The Pharmacists Survey conducted by the OHSC showed that in 1962 about 600 pharmacists, one-third of whom were not licensed, were working in hospitals in Canada. The high proportion of non-licensed practitioners is due to the fact that at present only two provinces require a licence for the practice of hospital pharmacy.

In 1962, T. M. Ross surveyed the pharmaceutical industry through the Canadian Pharmaceutical Manufacturer's Association. He found that the industry employed 612 pharmacists, and that 456 more would have been employed at prevailing salaries if they had been available. If we assume similar shortages among those who did not respond to the survey, the industry could have employed an additional 515 pharmacists.¹¹ However, the shortage of pharmacists is not as

⁹Faculty of Pharmacy, University of Toronto, Brief to the Committee on the Healing Arts.

¹⁰Faculty of Pharmacy, University of Toronto, Brief to the Committee on the Healing Arts.

¹¹Faculty of Pharmacy, University of Toronto, Brief to the Committee on the Healing Arts.

severe as these figures suggest. Almost all these positions are being adequately filled by detail men and by other persons with degrees in scientific fields.

There are also unfilled positions in the government services and in the armed services. In 1962, the federal government employed thirty-seven pharmacists but had nineteen vacancies. The provincial governments employed a total of fourteen pharmacists but they wanted thirteen more. The armed services employed seventy-seven pharmacists within their three branches and there were thirteen established positions unfilled. It is possible that the integration of the armed forces will reduce the needs of this area.

There are a few additional important points to consider when evaluating the available staff of pharmacists. For all of Canada, in 1962 30.4 per cent of the population lived in rural areas, as compared with only 6.4 per cent of the licensed pharmacists. In cities over 200,000, there were 38.1 per cent of the population and 42.5 per cent of the pharmacists. Since 1940, 60 per cent of the students in the University of Toronto Faculty of Pharmacy have come from the Toronto area and have remained to practise there.

Demographic trends such as population increase maintain a strong demand for pharmacists. Now that most people consider drug treatment necessary to any recovery (over 400 new prescriptions appear annually¹²), the demand is far greater; and if prescription benefits are included in Ontario's medicare plan, it will grow even more. The staff of the University of Toronto Faculty of Pharmacy have estimated that the accumulated deficit of pharmacists will be critical by 1971.

How effectively do pharmacists use their professional skills? In 1962, in Canada, 87 per cent of the pharmacists were in retail outlets (80 per cent for Ontario). These pharmacists averaged 2.2 prescriptions per hour. Pharmacists working in hospitals averaged thirteen prescriptions per hour. In 1960, the Ontario College of Pharmacy estimated that prescribed drugs amounted to 25 per cent of the retail pharmacist's sales. (The University of Toronto Faculty of Pharmacy feels that approximately 50 per cent of sales are a result of direct or implied professional services.) Even when using his time on drugs, the pharmacist is largely a dispenser now. The importance of the pharmacist, however, may depend more on what he *knows* than on what he *does*. With more and more complex medicines, he may be needed on a stand-by service as a constant advisor. In 1951, 15 per cent of the prescribed drugs were precompounded, as compared with 90 per cent in 1961.¹³

Beyond the pharmaceutical profession, there are five medical practitioners in Ontario who sell drugs themselves. Only 2,500 of the pharmacists in Ontario today have signing privileges for narcotics.

¹²Royal Commission on Health Services, Vol. II, *op. cit.*, Ch. 2.

¹³Faculty of Pharmacy, University of Toronto, Brief to the Committee on the Healing Arts.

TABLE A107

Ontario College of Pharmacy Districts (Based on Electoral Divisions) in Ontario¹

-
1. The Counties of Carleton, Dundas, Glengarry, Grenville, Lanark, Leeds, Prescott, Renfrew, Russell, Stormont.
 2. The Counties of Durham, Frontenac, Haliburton, Hastings, Lennox and Addington, Northumberland, Ontario, Peterborough, Prince Edward, Victoria.
 3. That portion of Metropolitan Toronto east of Bayview Avenue.
 4. That portion of Metropolitan Toronto east of Bathurst Street, being west of and including said Bayview Avenue.
 5. That portion of Metropolitan Toronto east of Jane Street and east of and including Parkside Drive, and being west of and including said Bathurst Street.
 6. That portion of Metropolitan Toronto west of Parkside Drive and west of and including Jane Street.
 7. The County of Simcoe.
The County of York excluding Metropolitan Toronto.
The Districts of Muskoka and Parry Sound.
 8. The Counties of Halton, Peel, Wentworth.
 9. The Counties of Haldimand, Lincoln, Welland.
 10. The Counties of Elgin, Middlesex, Norfolk, Oxford.
 11. The Counties of Essex, Kent, Lambton.
 12. The Counties of Brant and Waterloo.
The County of Wellington, excluding the Townships of Arthur, Maryboro, Minto, West Luther.
 13. The Counties of Bruce, Dufferin, Grey, Huron, Perth.
The Townships of Arthur, Maryboro, Minto, West Luther in the County of Wellington.
 14. The Districts of Cochrane, Manitoulin, Nipissing, Sudbury, Temiskaming.
 15. The Districts of Algoma, Kenora, Rainy River, Thunder Bay.
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¹Effective prior to the 1965 election.

TABLE A108
Registration of Pharmacists by Districts, Ontario, 1968

District	Owners or managers	Those who are not owners or managers	Total
1	213	156	369
2	207	137	344
3	191	269	460
4	205	269	474
5	191	233	424
6	108	128	236
7	130	80	210
8	237	191	428
9	121	66	187
10	154	101	255
11	174	87	261
12	130	61	191
13	99	35	134
14	95	43	138
15	92	39	131
Registered elsewhere	—	219	219
	2,347	2,114	4,461

SOURCE: Ontario College of Pharmacy.

TABLE A109

**Qualifications of Pharmacists Who Are Owners and Managers, by Place of
Employment, Ontario, 1968**

District	Owners				Managers				Hospitals and clinics ¹				Estates	Total											
	No deg.		Phm.B.		B.Sc.Pharm.		Sp. Reg.		No deg.		Phm.B.				B.Sc.Pharm.		Sp. Reg.								
	M	F	M	F	M	F	M	F	M	F	M	F			M	F	M	F							
1	6	47	2	5	6	10	77	2	23	1	17	3	1	3		1	3		1	7	2	213			
2	4	49	4	8	3	11	70	7	19		8			15	3	2			2	1	1	207			
3	2	55	1	9	1	1	67	2	36	4	5	1			2	1			1		2	1	191		
4	3	51	1	9	3	5	68	2	36	2	7			6	2	2	3	2	1			205			
5	2	70		9	2	3	29		44	2	10	4		1	3	1	3	1				191			
6	1	19		6	1	2	51	1	22	2						1	1	1				108			
7	4	37	2	3	2	5	38	3	16	1	6			6	1	2	1	1				130			
8	3	49	1	11	2	5	89	3	48	3	9	1		6	2	1		1				237			
9	4	23		2	2	4	55	7	15	1	1			5	1		1					121			
10	5	35	3	1	1	4	66	1	14	2	7	1		1	8	2	2					154			
11	4	31	2	6	2	6	75	7	23	3	6			9								174			
12	3	40		4	2	4	37	1	18		5	1		3	4	1	3	2	1			130			
13	9	33	1	1	1	1	31	2	9		2			1	4	1		1				99			
14	4	18		4		3	36		13	1	7			6	1	1	1					95			
15	1	11	1	2	1	1	30	3	12		16	3		6	1	1		3				92			
55	0	568	18	80	2	32	8	65	1	819	41	348	22	106	14	11	0	79	18	17	14	21	7	1	2,347

¹Five of the hospital pharmacists are with the Canadian Forces.

SOURCE: Ontario College of Pharmacy.

TABLE A110

**Qualifications of Pharmacists Who Are Not Owners or Managers, by Place of
Employment, Ontario, 1968**

District	No degree		Phm.B.		B.Sc.Pharm.		Spec.Register) ¹		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
1	13	2	59	14	14	13	26	15	156
2	19	—	59	15	15	14	11	4	137
3	25	—	97	15	58	37	22	15	269
4	15	2	118	11	48	31	24	20	269
5	16	—	105	8	61	30	8	5	233
6	12	1	51	12	18	21	6	7	128
7	15	—	34	8	10	7	5	1	80
8	27	—	73	21	30	20	10	10	191
9	3	1	32	6	6	9	4	5	66
10	14	—	55	8	6	7	3	8	101
11	21	—	30	6	10	9	5	6	87
12	11	—	21	7	11	6	3	2	61
13	6	1	17	6	1	1	3	—	35
14	9	1	14	3	8	6	1	1	43
15	5	—	8	5	6	5	5	5	39
Alberta	1	1	1	1	2	—	3	1	10
B.C.	3	—	10	5	3	1	5	4	31
Manitoba	—	—	2	2	—	—	4	1	9
New Brunswick	—	—	1	1	2	—	—	—	4
Nova Scotia	—	—	2	—	1	—	—	—	3
P.E.I.	—	—	1	—	—	—	—	—	1
Quebec	1	—	39	5	7	2	5	1	60
Saskatchewan	—	—	2	—	—	1	2	—	5
Africa	—	—	1	1	—	—	—	—	2
Bermuda	—	—	1	—	1	—	—	—	2
Brazil	—	—	—	—	—	—	1	—	1
England	—	—	—	—	—	2	3	5	10
Europe C.A.F.	—	—	1	—	1	—	1	—	3
Hong Kong	—	—	—	1	—	—	—	—	1
Ireland	—	—	—	—	—	—	1	—	1
Israel	—	—	—	—	2	—	—	—	2
Korea	—	—	—	—	1	—	—	—	1
New Zealand	—	—	—	—	1	1	—	—	2
N.W.T.	—	—	1	—	—	—	—	—	1
Mexico	—	—	—	—	1	—	—	—	1
Scotland	—	—	—	—	1	—	1	—	2
U.S.A.	3	—	18	7	16	8	9	5	66
West Indies	—	—	—	—	—	—	1	—	1
	219	9	853	168	341	231	172	121	2,114

¹Twenty registrants are Medical Doctors: M.D. — four; Phm.B. and M.D. — three; B.Sc.Pharm. and M.D. — twelve; B.S.P. and M.D. — one.

SOURCE: Ontario College of Pharmacy.

TABLE A111
Number of Pharmacies in Ontario, 1968

District	Sole owner	Partners	Estate	Corp- oration	Corp. + pharmacist	Total retail	Hospital and clinic
1	60	4	0	86	0	150	16
2	47	11	0	70	2	130	19
3	47	14	0	81	0	142	5
4	60	9	0	77	1	147	17
5	71	13	0	58	0	142	7
6	21	3	0	55	0	79	3
7	45	3	0	41	0	89	10
8	55	9	0	100	1	165	10
9	29	1	0	57	0	87	7
10	39	4	1	62	0	106	10
11	36	5	0	71	0	112	9
12	46	2	0	46	0	94	7
13	39	3	0	34	0	76	11
14	24	1	0	45	0	70	9
15	16	0	0	47	0	63	9
Total	635	82	1	930	4	1,652	149

SOURCE: Ontario College of Pharmacy.

TABLE A112
Registration in the Ontario College of Pharmacy, 1955-1968

Date	Number registered
Sept. 1955	3,411
May 1957	3,730
May 1958	3,728
May 1960	3,828
Nov. 1962	4,063
Nov. 1964	4,271
Nov. 1965	4,309
Nov. 1966	4,347
Nov. 1968	4,461

SOURCE: Ontario College of Pharmacy.

TABLE A113
Pharmacists and Population, Ontario, 1955, 1965, 1968

Year	Pharmacists	Population ¹	Population per pharmacist
1955	3,411	5,266,000	1,544
1965	4,309	6,788,000	1,575
1968	4,461	7,306,000	1,638

¹Canada Yearbook, Queen's Printer, Ottawa, 1968.

SOURCE: See Table A112.

The pharmacist-population ratio has not changed appreciably over the last ten years. A substantial portion (22 per cent) of the new registrants in the Ontario College, however, have been from other jurisdictions (principally Saskatchewan).¹⁴

TABLE A114
Net Decreases in the Number of Pharmacies in Ontario, 1962-1968

Year	Number of pharmacies closed minus the number that were opened
1968	48
1967	42
1966	48
1965	46
1964	30
1963	44
1962	31

SOURCE: Ontario College of Pharmacy.

TABLE A115
Membership in the Ontario Pharmacists' Association, 1940-1965

Year	Membership		Total
	Active	Associate	
1965	1,318	83	1,401
1960	1,300	101	1,401
1950	1,344	35	1,378
1940	821	30	850

SOURCE: Ontario Pharmacists' Association, Brief to the Committee on the Healing Arts.

TABLE A116
Additions¹ to the Register of Pharmacists, 1956-1968

Year	Graduates, U. of T. Faculty of Pharmacy	Pharmacists from other jurisdictions	Total
1956	46	35	81
1957	45	37	82
1958	80	29	109
1959	69	29	98
1960	92	8	100
1961	72	13	85
1962	73	15	88
1963	117	12	129
1964	76	22	98
1965	89	12	101
1966	79	35	114
1967	68	35	103
1968	86	74	160
Total	992	356	1,348

¹Does not include reinstatement of previously registered persons.

SOURCE: Ontario College of Pharmacy.

¹⁴Ontario College of Pharmacy, Brief to the Committee on the Healing Arts.

TABLE A117
Pharmacies and Population, Ontario, 1955, 1965, 1968

Year	Pharmacies	Population	Population per pharmacy
1955	1,922	5,266,000	2,740
1965	1,787	6,788,000	3,799
1968	1,652	7,306,000	4,423

SOURCE: Ontario College of Pharmacy.

There has been a diminution in the general increase in membership since 1950, as well as a decrease in the number of active members. As of 1965, 30 per cent of the registered pharmacists and 75 per cent of the retail store owners were in the Association.

Education

To be accepted and registered by the Ontario College of Pharmacy, one must graduate from a four-year university course and then undergo a twelve-month apprenticeship (six months must be consecutive) under a pharmaceutical chemist in a "teaching pharmacy" approved by the College (i.e., a pharmacy that dispenses more than 2,000 prescriptions annually). The University of Toronto graduate is accepted without any further examination. A pharmacist must be registered in order to practise.

The University of Toronto Faculty of Pharmacy is the only school for pharmacists in Ontario. It can take a maximum of 130 students in each of its first and second years. The size of classes is governed by the limited laboratory space available. Thus 130 is the maximum number of graduates that we can expect each year. By 1975 this supply will be inadequate. In 1967 49 per cent of the first-year class were women. (This figure has been increasing.) Many female pharmacists do not practise for long because of marriage.

In 1966-1967 a total of 447 students were enrolled in the entire four-year program. By 1971 there will be 505.

Since 1953, the faculty has offered a Master's degree. As at December 1966 forty had completed the degree and seventeen were working on it. In the Ph.D. program, initiated in 1962, as at December 1966, one student had completed the degree and three were working on it.

The Faculty of Pharmacy feels there is an acute shortage of staff. The 1967 faculty of forty-nine was composed of one dean, four professors, five associate professors, three assistant professors, two lecturers, two research assistants, and thirty-two laboratory demonstrators. Fifty to sixty new staff members with at least a Ph.D. are required during the next ten years.¹⁵ We cannot draw from the U.S.A. or the U.K., as there are great shortages there also.

A one-year, postgraduate residency program in hospital pharmacy is offered at three teaching hospitals with the cooperation of the faculty. This program leads to a certificate. As more hospitals become usable, the faculty plans to expand this program.

Evening classes covering twenty weeks annually are offered by the faculty to aid pharmacists in keeping informed of recent developments.

Pharmaceutical Manufacturers

There are fifty-eight pharmaceutical manufacturing companies in Canada, and they account for 58 per cent of the prescription pharmaceuticals made and sold in this country. Total drug costs come to about 10 per cent of all expenditures on health services. There are about 8,000 prescriptions available in Canada and they are being prescribed by about 15,000 members of the medical profession (those of the profession that use drugs). Of the 8,000 prescriptions 90 per cent were introduced after 1940 and 40 per cent were introduced after 1954.¹⁵

Through a survey by the Pharmaceutical Manufacturers' Association of Canada, it was found that forty-nine companies employ 1,799 detail men. These detail men are the channels of communication from the manufacturers to the doctors. For the industry as a whole there is one detail man for every ten physicians. Sparsely populated areas do not receive the services of detail men; communication then depends on journal advertising.

A survey for the medical doctors of Canada in 1963 (by MRC Limited, who interviewed 200 English-speaking physicians across Canada) found that 98 per cent saw at least some of the detail men who called. The average number of calls was 11.5 per month, and the average length of time of call was thirteen minutes. Twenty-three per cent of the doctors screened the detail men in some way.

Forty per cent of the detail men working for member companies of the Pharmaceutical Manufacturers' Association of Canada have university degrees and 72 per cent have had some university exposure. The degrees held by the 40 per cent are distributed as follows:

Pharmacy	40%
Other science degree	26%
B.A.	20%
B.Comm.	8%
Postgraduate	2%
Other	4%
	<hr/> 100%

¹⁵Faculty of Pharmacy, University of Toronto, Brief to the Committee on the Healing Arts.

¹⁶Royal Commission on Health Services, Vol. I, *op. cit.*, p. 340.

Optometrists, Opticians and Medical Refractionists

Optometrists

The present ratio of optometrists to population in Ontario is 1:13,000. The Canadian Association of Optometrists advises that we must have a ratio of 1:10,000. At present there is no subnormal vision care or vision training in Ontario.

In its brief to the Royal Commission on Health Services, 1962, the Canadian Association of Optometrists estimated that 90 per cent of the optometrists in Canada practised privately. There were only a few clinics then, but there has been a growing tendency towards group practice. Now (1966) 450 out of 533 (84 per cent) practise privately.

In 1961, the Canadian Association of Optometrists listed 533 members, as compared with the census estimate of 414. The Canadian Association of Optometrists suggests that this may be explained by the fact that, although they are temporarily not practising, many hold their licences to avoid the inconvenience of obtaining them again when they wish to recommence practising.

Optometrists refer about 2 to 4 per cent of the cases they see to medical doctors. This is considered adequate by the College of Optometry of Ontario. (In surveys in 1957 and 1960, however, the Canadian Association of Optometrists found a referral rate of 4.4 per cent.)

In their 1962 brief to the Royal Commission on Health Services, the Canadian Association of Optometrists estimated that 13.2 per cent of the Canadian population was using eye care.

There are two schools for optometrists in Canada: the College of Optometry of Ontario (Toronto) and L'Ecole d'Optometrie de Montreal (French-speaking). In 1966 the University of Waterloo was planning a school of optometry. There are ten institutions in the United States. Of the approximately 1,500 optometrists now in Canada, about half are graduates of the Ontario College. Many more apply than are accepted. Each year about twenty-five graduate from the four-year course; 100 students are attending the college at present. Two post degree courses are offered each year. In 1966, seventy-two optometrists were enrolled in at least one of these.

The requirements to be an optometrist have varied over the years. In 1930 the requirement was grade 12 plus a two-year course. In 1937 it was grade 13 plus three years, and in 1954 it was grade 13 plus four years.

TABLE A118
Optometrists by Province, 1961-1968

Province	1961	1962	1963	1964	1965	1966	1967	1968
British Columbia	148	144	145	142	147	—	—	—
Alberta	112	110	111	108	112	—	—	—
Saskatchewan	74	72	72	65	66	—	—	—
Manitoba	57	58	57	56	57	—	—	—
Ontario	533	533	533	527	521	525	522	519
Quebec	420	—	—	—	453	—	—	—
New Brunswick	38	37	39	38	38	—	—	—
Nova Scotia	40	39	40	41	39	—	—	—
Prince Edward Island	4	4	4	4	5	—	—	—
Newfoundland	6	6	6	11	15	—	—	—
Total	1,432	—	—	—	1,465	—	—	—

SOURCE: Canadian Association of Optometrists.

The figures in this chart deviate considerably from the figures in the Association's 1962 brief. The figures in the Royal Commission on Health Services concur with those in the 1962 brief. All data are obtained by survey of the provincial associations. The more recent data have been assumed more accurate for the purposes of this study.

TABLE A119
Optometrists in Ontario, 1930-1968

Year	Number
1968	519
1965	521
1960	533
1955	580
1950	665
1940	690
1930	523

SOURCE: Canadian Association of Optometrists.

These data coincide with those of the College of Optometrists of Ontario.

TABLE A120
Distribution of Optometrists of Ontario by the Standard Required, 1965

Standard required	Number
Statutes prior to 1940	188
Statutes between 1940 and 1952	171
Present statutes	174
Total	533

SOURCE: Canadian Association of Optometrists.

TABLE A121
Membership in the Optometrical Association of Ontario, 1930-1969

Year	Total members	Active	Life	Associate	Honourary
1969	399	367	22	10	—
1965	385	355	21	6	3
1960	380	353	19	5	3
1950	363	330	24	7	2
1940	346	n/a	n/a	n/a	n/a
1930	302	n/a	n/a	n/a	n/a

SOURCE: Optometrical Association of Ontario.

Seventy-two per cent of the registered and practising optometrists belong to the Ontario Association. Regarding the 1965 figures, all active members are in practice. Of the life members, all reside in Ontario and fifteen are in practice. Of the associate members, two reside in Ontario and none practises. Of the honorary members, two reside in Ontario and one is in practice. The total number in the Association and practising in 1965 was 371.

TABLE A122
Distribution of the Canadian Population by Eye Care Needs, 1962

Percentage	Condition
41	Do not require care
30	Are getting adequate care
14	Have uncorrected problems
10	Obsolete or improper corrections
5	Uncorrectable

SOURCE: Canadian Association of Optometrists, Brief to Royal Commission on Health Services, 1962, p. 25.

TABLE A123
Distribution of Students¹ Attending the Ontario College of Optometry, According to Native Province or Country, 1961-1962

Place	Percentage
Ontario	49
Western provinces	26
Quebec	3
Eastern provinces	9
Foreign countries	13

¹67 students.

SOURCE: *The Canadian Journal of Optometry*, September-December, 1962.

Opticians (Ophthalmic Dispensers)

The Board of Ophthalmic Dispensers of Ontario is the licensing body. In 1960, there were 157 licensed opticians in Ontario, and in 1966 there were 391. The 1966 figure consists of the following: 291 active dispensers; eighty-six with licences but who are working in a laboratory; and nine who are retired.

The Board's figure of 157 licensed opticians for 1960 is far from the 1961 census figure of 764 "Lens grinders, polishers, opticians". However, more persons than those grinding eye glass lenses may enter their occupation in this category on the census.

The Ontario Association of Dispensing Opticians Inc. was formed in 1950. Its membership is given in Table A125.

The education of opticians consists of a home study course followed by on-the-job training. This program was set up in 1963. So far there have been about thirty graduates from this course per year (twenty-seven in 1964, thirty-seven in 1965, and twenty-nine in 1966). In 1967 there were 113 in the course, sixty-one in the first year and fifty-two in the second year. In two or three more years seventy-five persons are expected to graduate from the course annually.

Medical Refractionists

Medical refractionists include ophthalmologists; eye, ear, nose and throat specialists; and general medical practitioners who are doing refractions. In 1962 there were 164 ophthalmologists and eye, ear, nose and throat specialists in Ontario. In 1966 there were 376.

The "optician-ophthalmologist team" provides 65 per cent of all eye care for the Ontario population.¹⁷

TABLE A124

Degrees of the Faculty of Optometry, College of Optometry of Ontario, 1966-1967

Rank	Total	Prof. Degrees				Academic Degrees Related to Optom.		Academic Degrees					
		O.D.	B.S.(Opt.)	M.D.	Dip.Opt.	M.Opt.	B.Opt.	Ph.D.	M.Sc.	M.A.	B.Sc.	B.A.	Other
Professor	4	3	—	—	4	—	—	1	2	1	—	3	—
Assistant Professor	3	—	—	1	2	—	—	—	1	—	—	—	—
Lecturer	7	2	—	1	2	—	—	—	1	2	—	3	—
Demonstrator	10	7	—	—	4	—	—	—	—	—	—	1	1
Total	24	12	—	2	12	—	—	1	4	3	—	7	1

SOURCE: College of Optometry of Ontario.

TABLE A125

Membership in the Ontario Association of Dispensing Opticians, Inc., 1960-1966

	Licensed members	Associate members ¹
1966	233 ²	60
1965	178	28
1960	135	90

¹Those who meet the qualifications but are not yet licensed.

²This represents 79 per cent of those licensed by the Ontario Board.

SOURCE: Ontario Association of Dispensing Opticians, Inc.

¹⁷Board of Ophthalmic Dispensers of Ontario, Brief to the Committee on the Healing Arts.

Chiropractors

Inventory

Various branches of the medical profession denigrate chiropractors, claiming that they are not scientists. Among these are McGill University, the Canadian Medical Association and the Royal College of Physicians and Surgeons.

In 1956 a study of chiropractic was conducted in Florida by the First Research Corporation (an independent organization). Records were microfilmed of 19,666 cases from the files of the Florida Industrial Commission. Types of back injuries treated by chiropractics responded in less time and at less expense than those treated by orthodox medical methods. Treatment by a G.P. was 27.5 per cent more costly than treatment by a chiropractor, and costs of medical specialists were 200 per cent greater. Under chiropractic care, the patient was returned to work in an average of 2.5 days, as compared to thirty days under a specialist's care.

According to the Workmen's Compensation Board of Ontario, in 1963 back and spine injuries accounted for 19.0 per cent of all cases and represented 20.3 per cent of the total costs.

The Board of Directors of Chiropractic examines and registers all chiropractors. In Ontario, they must be registered in order to practise. In 1965 there were 605 registered, sixty-nine of whom were from outside Ontario.

The Ontario Chiropractic Association divides the province into eleven districts. In 1968 it had 327 members. The Association estimated that there were 500 in active practice and that 75 per cent of these were members.

The Canadian Chiropractic Association obtains its memberships through the provincial associations. In 1965, it had 885 members.

In a survey of chiropractors in Canada¹⁸, 45 per cent considered themselves specialists although nobody could classify them as such. The largest group was musculo-skeletal specialty. Seventy-six per cent had radiological equipment, 7 per cent x-rayed all patients; 33 per cent x-rayed two-thirds or more of their patients; and another 10 per cent x-rayed half of their patients.

TABLE A126
Membership in the Ontario Chiropractic Association, 1944-1968

1968	327
1966	352
1965	337
1960	225
1944	156

SOURCE: Ontario Chiropractic Association.

¹⁸For the Royal Commission on Health Services, *op. cit.*, 1962.

TABLE A127
Registered Chiropractors in Canada, 1943-1968

1968	1,326
1961	1,073 ¹
1951	740
1943	668

¹There were 450 in Ontario.

SOURCE: Board of Directors of Chiropractic.

TABLE A128
Chiropractors in the U.S.A., Canada and the Provinces, 1965

U.S.A.	20,000
Canada	1,255
British Columbia	150
Alberta	150
Saskatchewan	36
Manitoba	44
Ontario	605
Quebec	243
New Brunswick	13
Nova Scotia	12
Prince Edward Island	1
Newfoundland	1

SOURCE: Occupation Monogram (also Board of Directors of Chiropractic, Brief to the Committee on the Healing Arts).

Training

The only place for training in Canada is the Canadian Memorial Chiropractic College in Toronto. The College offers a four-year course after grade 13; there are tentative plans to make it a five-year program. During the years 1949 to 1961 the school graduated 669 persons. During the same period of time, 605 Canadians graduated from colleges in the United States.

In the twenty-one years since the founding of the Canadian Memorial College of Chiropractic, 446 (or 56 per cent) of the graduates have come from Ontario. The spread between registration and application has been 19 per cent in 1964-1965 and 30 per cent in 1966-1967. The College feels that this 30 per cent is a maximum. It hopes first-year registrants will number 158 by 1971.

TABLE A129

**Graduates of the Canadian Memorial College of Chiropractic, by Place of Origin,
1949-1968**

	Number	Percentage
British Columbia	106	12.4
Alberta	35	4.1
Saskatchewan	63	7.3
Manitoba	26	3.0
Ontario	477	55.7
Quebec	46	5.4
Maritimes	15	1.7
U.S.A.	40	4.7
Other countries ¹	49	5.7
	857	100.0

¹Britain, France, Norway, Sweden, Denmark, Germany, Switzerland, South Africa, Australia, New Zealand, Hong Kong, Pakistan.

SOURCE: Canadian Chiropractic Association.

TABLE A130

Faculty of the Canadian Memorial College of Chiropractic, 1969

Doctors of Chiropractic	23
Ph.D.'s	2
B.Sc.'s	1
Visiting lecturers	6
Total	32

SOURCE: Canadian Memorial Chiropractic College, *Calendar 1969/70*.

Osteopaths

Inventory

In Ontario, osteopaths are not allowed to practise as they have been trained. According to the Drugless Practitioners' Act of Ontario, an osteopath cannot prescribe or administer drugs; or use, direct, or prescribe the use of anaesthetics for any purpose; or practise surgery or midwifery. Six other provinces in Canada accept and legalize osteopathy. The four others have provisions for osteopathy under the Medical Act. These are Alberta, British Columbia, New Brunswick and Nova Scotia. In Nova Scotia, the osteopath must also be a doctor. In Manitoba an osteopath can practise midwifery. In thirty-nine states in the U.S.A., osteopaths have unlimited practice under the control of a medical board.

There are fifty registered osteopaths in Ontario today. Their average age in 1966 was 61.4 years, nine were over seventy-five; eight were under fifty; none was under forty.

In the United States, osteopaths are handling the total health needs of 8 to 10 per cent of the U.S. population. This is a figure equal to the whole population of Canada.

In 1962, Ontario had seven-tenths of Canada's osteopaths and four-tenths of its population.¹⁹ In the late 1930's there were 135 osteopaths in Ontario; the number has declined steadily since. Mills also found that 18 per cent of the practising osteopaths are working part time; and 42.1 per cent are in communities of under 25,000 population. All are in communities of under 250,000 population. In the U.S.A., 30 per cent of the osteopaths specialize. In Canada, probably because of the more restricted scope of the laws, 66 per cent specialize.

In 1952, 88 per cent of the medical students who tried them passed the basic science examinations. In the same year, 85 per cent of the osteopathic students passed the same examinations.

TABLE A131
Registered Osteopaths in the Board of Directors of Osteopathy of Ontario, 1930-1969

	<u>No. registered</u>	<u>No. in Ontario</u>
1969	59	50
1968	62	52
1967	67	60
1966	67	60
1965	74	67
1960	79	72
1950 ¹	113	102
1940 ¹	118	—
1930 ¹	102	—

¹From the Board of Regents' files.

SOURCE: Board of Osteopathy of Ontario.

TABLE A132
Membership in the Ontario Osteopathic Association, 1930-1965

	<u>Regular members</u>	<u>Honourary members</u>	<u>Total</u>
1965	38	5 ¹	43 ²
1960	45	5	50
1950	51	9	60
1940	59	5	64
1930	80	—	80

¹All are retired and out of practice.

²All are resident in Ontario; 70 per cent of all practising are these forty-three members.

SOURCE: Ontario Osteopathic Association.

¹⁹D. Mills, *Chiropractors, Osteopaths, and Naturopaths in Canada*, a report to the Royal Commission on Health Services, Queen's Printer, Ottawa, 1962.

TABLE A133
Osteopaths in Each Specialty, Canada, 1962

Specific type of musculo-skeletal condition treated	Percentage of osteopaths
Tumbro-sacral	65
Arthritis	30
Cervical-upper dorsal region	26
Back region	11
Extremities	26
Subluxations	7
Shoulder region	12
Strains	16
Injuries	19
Thoracic region	3

SOURCE: D. Mills, *Chiropractors, Osteopaths, and Naturopaths in Canada*, a report to the Royal Commission on Health Services, Queen's Printer, Ottawa, 1962.

TABLE A134
Major Items of Diagnostic Equipment, Osteopaths in Canada, 1962

	Percentage
Radiological	22
Neurological and psychological	3
Musculo-skeletal	9
Cardiovascular	66
Chemical analysis	41

SOURCE: See Table A133.

TABLE A135
Numbers Treated in Workmen's Compensation Boards by Osteopaths in Canada, 1958-1961

	1958		1959		1960		1961	
	Chir.	Oste.	Chir.	Oste.	Chir.	Oste.	Chir.	Oste.
Approx. number of claimants treated	4,012	56 ¹	3,368	38 ¹	6,966	40 ¹	5,227	45 ¹
Number of practitioners receiving payments	382	56	399	39	399	43	436	45
Average total payment per claim	\$ 232	132	270	190	276	145	272	138
Total payments	\$88,600	7,397	107,616	7,426	110,230	6,250	118,454	6,198

¹Not available in Mill's report, but these are the approximate figures.

SOURCE: See Table A133.

Training

To be an osteopath, one must have a three-year B.A. in science, and then have graduated from an accredited college. This takes a total of four years of study. No graduate internship is required but 98 per cent of graduates serve a rotating internship of one year, in one of the ninety-one Intern Training Approved Hospitals.

There are five colleges accredited by the Board of Directors of Osteopathy. None of these is in Ontario. They are

Chicago College of Osteopathy

College of Osteopathic Medicine and Surgery in Des Moines, Iowa

Kansas City College of Osteopathy and Surgery

Philadelphia College of Osteopathy

Kirksville College of Osteopathy and Surgery.

An osteopath can get a specialty by residency training in any one of the eighty accredited hospitals in the United States.

Drugless Therapists — Naturopaths

Naturopathy contains everyone from fresh air enthusiasts, osteopaths, and chiropractors, to orthodox medical practitioners. In Mill's study of naturopaths in 1962, it was reported that a sizable number of practitioners practised as "chiropractor-naturopaths".

It is possible that orthodox medicine will be permeated with naturopathic medicine; for example, in Germany there are over 12,000 naturopathic practitioners, of whom probably 10,000 are qualified and registered doctors.

Many chiropractors should be registered as drugless practitioners, since they are using methods permitted only licensed drugless therapists. They, themselves, are not so qualified.

The Board of Directors of Drugless Therapy licenses and regulates the naturopaths in Ontario. One must be licensed in order to practise. To obtain a license one must take two years of university; graduate from the National College of Naturopathic Medicine in Portland, Oregon, or its Seattle Branch (four years); and then pass the Board's examination.

In 1965, there were 150 naturopaths registered by the Ontario Board. In 1953, there were 309 registrants.

At present, the Ontario Naturopathic Association has thirty members, who (it is claimed) comprise 25 per cent of those practising in the province.

Mill's study revealed that all of the following types of diagnostic equipment were used by at least some naturopaths:

	Percentage
X-ray, radiograph or spinograph	9
Stethoscope	14
Neurocalometer	2
Urinary diagnostic kit	8
Ophthalmoscope	8

Some extreme practitioners in the U.S.A. use radio wave devices and diagnose by telephone messages.

At present there is no college for training naturopaths in Ontario, although a college committee was appointed by the Ontario Naturopathic Association in 1963.

Medical Laboratory Technologists

The Canadian Society of Laboratory Technologists estimates that 50 per cent of those working in laboratories are members in the Society. If this ratio holds for Ontario also, there were 2,044 (2 x 1,022) laboratory technologists in Ontario in 1962. In an extensive survey between December 1965 and April 1966, the Ontario Society of Medical Technologists found that there were 2,091 laboratory technologists practising in Ontario Hospitals. From data contained in the following tables, this would mean that 652 technologists working in the hospital laboratories of Ontario are not registered. Our figures do not give a perfect inventory, however. There are nineteen major centres in Ontario that have public health laboratories. Also there are the private medical laboratories which have no regulation governing them or their personnel. (The section on Pathology of the Ontario Medical Association is investigating this situation now.)

The return in the 1966 Ontario survey comprised 846 technologists (697 R.T.'s, 115 A.R.T.'s, and thirty-four Licentiates). The number actually citing place of employment and salary in private laboratories in Ontario was forty-eight. The Canadian Society will not hazard a guess, however, at how many technologists are employed in private laboratories.

The number of laboratory technologists trained cannot be greatly increased without reducing the practical hospital experience. The existing hospital training schools estimate an 18.6 per cent increase is the maximum possible under existing conditions. Many of the present supply were trained outside of Canada (for example, in the Philippines), and if this supply were to fall off, there would be even more pressure on our schools. One reason so many technologists must be trained is that many are lost to marriage very soon after certification.

The different certificates available to technologists are R.T., a two-year program; A.R.T., which requires three to five years experience and a thesis; and C.S.L.T. (L.C.S.L.T), which requires an additional four years or more and an examination.

The shortage of teachers is aggravated by the existence of many small local laboratories. Many hospitals are training only ten to fifteen students; the staff members are not adequately trained.

Few university graduates are technologists because of low salaries. The Universities of Montreal and Laval have two-year diploma courses. The University of Saskatchewan (Regina) has a two-year course followed by nine months' training (graduates from this program seem to be very well trained). There is no similar program in Ontario. Very few technologists extend their formal education past the R.T. In Ontario fifty-six women (9 per cent of the technologists on staff) and thirty-three men (21.2 per cent) in ninety hospitals that were covered in the Ontario Society's survey had taken further formal training.

Studies by the Ontario Hospital Services Commission stated that between 1964 and 1970 Ontario would need 1,805 new technologists; that is, at least 300 new students each year.

TABLE A136**Canadian Society of Laboratory Technologists, Membership in Ontario, 1968**

Registered	
R.T.	1,507
A.R.T.	198
L.C.S.L.T.	47
Associate:	
Inactive	339
Non-certified	364
Trainee	450
Total	2,905

SOURCE: Canadian Society of Laboratory Technologists.

There also exists an Ontario Society of Medical Technologists. Membership in the Ontario Society is contingent on membership in the Canadian Society. In 1966, the Ontario Society had 842 members, 592 active and 250 associate. In 1965, there were 475 members, 375 active and 100 associate.

TABLE A137
Membership in the Canadian Society of Laboratory Technologists
in Canada, 1940-1968

	1940	1950	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Registered Members	255	—	1,545	1,765	2,274	2,931	3,346	3,618	4,015	4,488	5,047	5,566
Associate members												
Inactive	2	—	320	340	455	508	492	572	727	832	962	1,114
Trainee	—	174	608	175	953	775	916	1,061	1,202	1,233	1,239	1,384
Non certified	—	—	—	184	352	440	451	480	554	675	832	991
Total membership	280	1,428	3,053	3,043	4,034	4,654	5,005	5,731	6,498	7,228	8,080	9,055
Percentage increase (annual)	—	—	10.6	23.5	32.1	15.4	11.8	10.1	13.4	11.2	11.8	12.1
Suspensions	—	—	390	410	167	180	321	292	281	343	315	413
Number deceased	—	—	—	2	3	6	9	3	1	3	6	3

SOURCE: Canadian Society of Laboratory Technologists.

Number of Medical Technologists**TABLE A138****Distribution¹ of Laboratory Technologists Who Are Members of the Canadian Society, Ontario, July 1967**

	<u>R.T.</u>	<u>A.R.T.</u>	<u>Licentiate</u>
<u>1) Toronto Area (25-mile radius)</u>			
Hospital laboratories	162	32	7
Provincial laboratories	26	1	—
Private laboratories	21	2	—
Institutes	13	3	—
<u>2) Hamilton and Niagara Peninsula</u>			
Hospital laboratories	106	23	10
Provincial laboratories	9	—	—
Private laboratories	15	—	—
Institutes	15	3	—
<u>3) Western Ontario</u>			
Hospital laboratories	107	16	8
Provincial laboratories	6	—	—
Private laboratories	2	—	—
Institutes	3	3	—
<u>4) Eastern Ontario</u>			
Hospital laboratories	91	10	3
Provincial laboratories	24	7	—
Private laboratories	5	—	—
Institutes	3	3	—
<u>5) Northern Ontario</u>			
Hospital laboratories	7	15	6
Provincial laboratories	9	—	—
Private laboratories	3	—	—
Institutes	—	—	—

¹These figures are by no means absolute and they were arrived at as a sub-product to our original purpose, salary averages. The actual allocation and appropriation of this information categorically necessitated discretionary decisions in many instances at some levels of certification; where it was almost impossible to ascertain their current place of employment, they were arbitrarily included with the hospital technologists. This is particularly noticeable at the Licentiate level.

SOURCE: Canadian Society of Laboratory Technologists.

TABLE A139**Extent to which the Survey Group Represents the Total Number of Medical Technologists**

Size of hospital (beds)	Number of hospitals		Number of technical staff		Percentage of staff surveyed
	Total	Survey	Total	Survey	
900+	4	4	366	273	74.5
400-899	16	12	579	451	78.0
300-399	21	14	373	247	66.5
200-299	23	19	316	282	89.0
150-199	13	8	83	56	67.5
100-149	21	13	107	95	89.0
Less than 99	83	21	146	62	42.5
Total	181	91	1,970 ¹	1,466 ¹	74.5

¹Includes full time and part time.

SOURCE: Ontario Society of Medical Technologists, Brief to the Committee on the Healing Arts.

TABLE A140**Medical Technologists: Proportion of Various Types of Qualifications Held and Proportion of Men in Service, Ontario, 1961, 1966**

Survey Date	Male %	R.T. %	Specialist Papers %	B.Sc. B.A. %	B.Sc. Phil. %	Other qualification %	No formal qualification %
1961	16.5	44.5	13.5	8.3	—	—	34.7
1966	20.3	42.7	10.7	4.0	5.1	3.9	33.6

SOURCE: See Table A139.

TABLE A141**Medical Technologists: Proportion of Sexes at Each Qualification Level, Ontario, 1966**

	Male	%	Female	%
L.C.S.L.T.	18	11.6	6	1.0
A.R.T.	33	21.2	56	9.7
R.T.	105	67.2	519	89.3
Total	156	100.0	581	100.0

SOURCE: See Table A139.

TABLE A142
Medical Technologists: Proportions of Staff Qualified and Unqualified

<i>Ontario Society of Medical Technologists Survey figures</i>				
	<u>Full time</u>	<u>Part time</u>	<u>Total</u>	<u>Percentage</u>
Qualified	1,155	35	1,190	82.2
Unqualified	249	27	276	18.8
<i>OHSC figure</i>				
Qualified	1,208	115	1,323	66.4
Unqualified	572	96	668	33.6

SOURCE: See Table A139.

TABLE A143
Hospitals that Provide Training for Technologists, 1966

<u>Hospital, by output in 1964</u>	<u>Number of hospitals</u>	<u>Number that did training</u>
Over 400,000 units	26	25
200,000–400,000 units	23	16
Below 200,000 units	41	4

SOURCE: See Table A139.

TABLE A144
**Technologists Leaving Hospital Staffs, by Reason for Leaving, from January 1963
to January 1966**

Surveyed staff, 1966	1,466
Total number that left position during the 3 years	1,042 ¹
Number going to other laboratories in Ontario	159
Number giving no reason	294
Number going to laboratories outside Ontario	152
Number going to laboratories abroad	137
Number going to private laboratories	3
Number going to industry	46
Number going to commerce	33
Number retiring	89
Number resigning due to pregnancy	68
Number resigning for home commitments	22
Number going to university	26
Number going to teachers' college	3
Number going to police force	1
Number discharged as unsatisfactory	9

¹One large hospital did not answer the survey.

SOURCE: See Table A139.

TABLE A145**Medical Technologists: Qualifications of Those Filling the Senior Staff Positions in Ontario Hospitals, 1966**

L.C.S.L.T., F.I.M.L.T., A.R.T., A.I.M.L.T.	123
B.A., B.Sc.	16
R.T., M.T. (A.S.C.P.) B.Sc., Pharm. (Philippines), R.N.	184
No formal qualifications	33
Total positions filled	356
Number of vacant positions	113
Positions established as senior positions	469

SOURCE: See Table A139.

The greatest problem in producing accurate distribution calculations is the constant flux of members municipally, provincially, and nationally. For all of Canada, the Society has an average of 150 changes of address weekly.

The Training of Medical Technologists**TABLE A146****Schools of Laboratory Technology in Ontario, 1967**

Regional schools of technology	3
Approved schools of technology in hospitals:	
Full-time training only	21
Part-time training only	
Both types of training	12
	45

SOURCE: See Table A139.

TABLE A147**Technologists Trained Outside Canada, 1961**

Place of training	Percentage of all technologists in Canada
U.K.	5.4
Philippine Islands	5.2
U.S.A.	2.9
Other countries	8.5
Total — Outside Canada	25

SOURCE: OMA Committee Survey Report, 1961-1962.

TABLE A148
Enrolment in the Regional Institutes of Technology, 1966

	Toronto Institute	Hamilton Institute	London Institute
Date started	1966	1962	1961
Students in opening year:			
1st year	69	50	20
2nd year	45	0	0
Present enrolment:			
1st year	69	78	35
2nd year	45	64	28
Present enrolment in advanced classes	92	—	—

SOURCE: See Table A139.

By 1968, the Toronto Institute plans to have 200 students in the first year. It also plans to have 100 students working for advanced certification. By 1971, the Hamilton Institute is planning for 125 students in the first year. By 1970 the London Institute will have ninety students in each year.

The present staff of the Toronto Institute consists of fourteen members (all have R.T.) and there are three vacancies. There are eighteen staff members at the Hamilton Institute, all with R.T.'s. This information was not available for the London Institute.

Radiological Technicians

In 1936 the Ontario Society of Radiological Technicians was formed. In 1963, this Society created the Board of Radiological Technicians as the registering body. However, technicians do not have to be registered to practise.

The use of the radiological technician is increasing steadily. The Ontario Hospital Services Commission claims that the number of radiological examinations in Ontario increased by 18.3 per cent from 1965 to 1967.

Training consists of a two-year program, approximately one year of lectures and one of experience. The entrance requirements are 60 per cent in grade 13 (or equivalent) and at least 50 per cent in the mathematics and science subjects. The final examinations are conducted by the Canadian Society of Radiological Technicians. No advance training now exists.

All classes are now filled, with 476 students training in the sixty-four accredited schools. This means an average of about seven students per school. It is generally found that 25 per cent of the students are lost very soon after certification to marriage, to other countries, and so on. Since 1956, five hospitals in Toronto have cooperated to make most of the first-year lectures identical.

Small hospitals have a special problem. Since they lack adequate supervision, they need the best people. In 1961, two-thirds of the hospitals with less than 100 beds did not employ a registered radiological technician.

TABLE A149
Membership in the Ontario Society of Radiological Technicians, 1940-1969

	1940	1950	1960	1965 ³	1966	1967	1968	1969
Active	126	223	583	910	1,041	914	1,029	1,110
Student	30	84	292	440	463	529	520	574
Non-practising ¹	—	—	135	247	—	168	151	168
Associate	—	—	24	98	351	82	105	100
Commercial associate	—	—	9	6	—	9	7	9
Radiologists	—	—	4	3	—	1	3	4
Honourary	—	—	—	3	—	—	—	—
Arrears	—	—	—	—	—	201	282	306
Total	156	307	1,147 ²	1,707	1,861 ⁴	1,904	2,097	2,271

¹Means part time.

²Twenty-one per cent of the total were male; 8 per cent of the students were male.

³In the Annual Meeting 1965 Report, the same Society gave the 1965 figures as follows: active, 905; students, 468; non-practising, 253; associate, 93; commercial associate, 3; radiologists, 4; honorary, 0; total 1,725.

⁴Twenty-two per cent of the total were male; 15 per cent of the students were male.

SOURCE: Ontario Society of Radiological Technicians.

For 1967, the Ontario Hospital Services Commission reported that 200 public general hospitals employed 1,048 full-time and ninety-four part-time radiologists, and that there were 476 students in training in hospitals. From this table, the Society calculates 440 students and 1,034 full-time equivalents ($910 + 247 \times \frac{1}{2}$). Thus there are more in the Society than are working in the hospitals, and the Society does not claim 100 per cent membership. The Board of Radiological Technicians listed 968 registered radiological technicians (R.R.T.'s) in 1965. In 1966 it listed 1,133 but said that there were about 800 others, such as persons who were in practice prior to the passing of the original Act which set up the Board (1963). Many of these individuals could probably pass the examination in any event.

EEG Technicians

These persons run an instrument called the electroencephalograph, which records electrical impulses in the brain. The physician (usually a neurologist or a neuropsychiatrist) uses the electroencephalograph tracings in diagnosing brain disorders. The technician must recognize abnormal wave patterns. He also must know his equipment in order to make minor adjustments and repairs.

There is no basic requirement or any formal training in Canada. The person simply takes on-the-job training under supervision. The U.S. Public Health Service supports six training programs (six to twelve months' duration) at five universities and one general hospital.

Neither membership in the Canadian Association, nor registration as an R.E.T. (Registered Electroencephalograph Technician) is necessary for practice in Canada. The R.E.T. has been set up by the Canadian Board of Registration of EEG Technicians, Inc. It requires a high school diploma, a one-year apprenticeship, one year of experience, one-year membership in the Canadian Association, and a passing grade on an examination set by the Association.

There were eighty members in the Canadian Association of EEG Technicians in 1960. In 1966 there were 170 members. Seventy-five per cent of those practising in Ontario are in the Canadian Association.

TABLE A150
Departments of Electroencephalography in the Province of Ontario,
EEG Technicians, May 30, 1969

City	Institution	Technicians	
		R.E.T.	Non R.E.T.
Belleville	Belleville General Hospital	1	—
Blenheim (Cedar Springs)	Ontario Hospital School	—	1
Brockville	Psychiatric Hospital	1	—
Cornwall	Hotel Dieu Hospital	—	1
Fort William	M'Keller General Hospital	n/a	n/a
Guelph	Guelph Reformatory	1	—
Hamilton	Ontario Hospital	1	—
	St. Joseph's Hospital	—	1
	Hamilton Civic Hospital	n/a	n/a
	Chedoke General Hospital	1	1
	Henderson General Hospital	1	—
Kingston	Kingston General	—	3
	Kingston Psychiatric	1	—
Kitchener	St. Mary's Hospital	n/a	n/a
London	St. Joseph's Hospital	1	—
	Westminster Hospital	1	—
	University of Western Ontario	n/a	n/a
	Victoria Hospital	1	1
	Children's Psychiatric Research Institute	2	1

SOURCE: Canadian Association of Electroencephalograph Technicians.

TABLE A150 (Continued)

**Departments of Electroencephalography in the Province of Ontario,
EEG Technicians, May 30, 1969**

City	Institution	Technicians	
		R.E.T.	Non R.E.T.
Millbrook	Millbrook Reformatory	1	—
Mississauga	South Peel Memorial Hospital	1	—
Ottawa	Ottawa General Hospital	1	2
	Ottawa Civic Hospital	3	1
Oakville	Oakville Trafalgar Memorial Hospital	1	—
Orillia	Ontario Hospital School	1	—
Port Arthur	Ontario Hospital	—	1
Sarnia	St. Joseph's Hospital	1	—
Sault Ste. Marie	General Hospital	—	1
Smith Falls	Ontario Hospital School	—	1
St. Catharines	St. Catharines General	n/a	n/a
St. Thomas	Ontario Hospital	—	3
Sudbury	Sudbury General Hospital	—	1
Toronto	Toronto General	—	3
	East General Hospital	—	1
	Toronto Western Hospital	—	2
	Queen Street Mental Health Centre	2	—
	Lakeshore Psychiatric Hospital	—	1
	Sunnybrook Hospital	2	—
	St. Michael's Hospital	1	—
	Clarke Institute of Psychiatry	2	—
	Humber Memorial Hospital	—	1
	North Western General	1	—
	Wellesley Hospital	—	1
	North York Branson	1	—
	St. Joseph's Hospital	1	—
	New Mount Sinai Hospital	—	2
	Hospital for Sick Children	—	4
	Scarborough General Hospital	—	2
	Toronto Western Hospital	—	2
	Scarborough Centenary Hospital	1	—
	Thistletown Children's Hospital	—	1
	North York General Hospital	1	—
	Addition Research Foundation, Alcohol & Drugs	—	1
	Institute of Aviation Medicine	1	n/a
Whitby	Ontario Hospital	—	1
Windsor	I.O.D.E. Memorial Hospital	1	—
	Windsor General	1	—
Woodstock	Ontario Hospital	2	—

SOURCE: Canadian Association of Electroencephalograph Technicians.

TABLE A150 (Continued)**Departments of Electroencephalography in the Province of Ontario,
EEG Technicians, May 30, 1969**

City	Institution	Technicians	
		R.E.T.	Non R.E.T.
<i>Private EEG Laboratories</i>			
Toronto	St. Clair EEG	1	—
	Western Medical Building	—	1
	Associated Electroencephalography	1	—
	Associated Electroencephalography (N. Toronto Branch)	n/a	n/a
	Medical Arts Building Toronto EEG	—	1
	Medical Building	—	1
	Electroencephalography Kingsway	n/a	n/a

SOURCE: Canadian Association of Electroencephalography Technicians.

Chiropodists

According to a recent survey taken in the U.S.A., 70 per cent of the population have some foot ailments; 40 per cent have foot problems by the age of six; 72 per cent have foot problems by high school age; and 85 per cent of the senior citizens have foot ailments.²⁰

People generally grant that there is a shortage of chiropodists, if the intention is to use them to ease the shortage of physicians. According to the Canadian Podiatry Association, there are 7,640 "foot doctors" in Canada in 1966. Canada needs 1,000 more podiatrists to service any comprehensive national plan based on 4.2 to 5.9 podiatrists per 100,000 population. According to the Royal Commission on Health Services there was one podiatrist for every 132,000 persons in Canada, and this is five times below the ratio of the United States and six times below that of the United Kingdom.

The Board of Regents of Chiropodists of Ontario administers registration, which is mandatory for practice in the province. The number of registrants is given in Table A151. In 1965, the Ontario Podiatry Association had fifty-three members. Fifty of these were in Ontario, and forty were practising. Eighty per cent of those practising in Ontario are members of this association.

The training in this field consists of grade 13, plus one year of university science, plus a four-year course leading to "Doctor of Podiatry". Then the

²⁰Board of Regents of Chiropodists of Ontario, Brief to the Committee on the Healing Arts.

candidate internes for three months, writes examinations, and is registered. The Board of Regents recognizes five colleges, none of which is in Canada:

Ohio College of Podiatry
 California Podiatry College
 Illinois College of Podiatry
 M. J. Lewis College of Podiatry in New York
 Pennsylvania College of Podiatry.

The Ontario Association gives a postgraduate course of not less than twenty-five hours to all its members each year.

TABLE A151
Number of Registered Podiatrists in Ontario, 1950-1967

	Number registered	Number in Ontario
1967	69	—
1965	75	71 ¹
1960	67	66
1950	70	67

¹All of these were practising in Ontario.

SOURCE: Board of Regents of Chiropractists of Ontario.

TABLE A152
Podiatric Clinics in Ontario, 1954-1965

	Year the clinic started
Riverview Hospital, Windsor	1954
St. Joseph's Hospital, Toronto	1956
St. Michael's Hospital, Toronto	1958
Toronto General Hospital, 1st Clinic	1958
Baycrest Hospital, Toronto	1961
Toronto West Hospital	1961
Toronto General Hospital, 2nd Clinic	1962
St. Mary's Hospital, London	1964
Women's College Hospital, Toronto	1965

SOURCE: Board of Regents of Chiropractists of Ontario, Brief to the Committee on the Healing Arts.

All six hospitals that sent in letters regarding their podiatric clinics recommended them as giving "good and valuable" service. All advised that such services be included in a medicare plan.

Psychiatrists

Inventory

Since 1957, all the larger hospitals have developed psychiatric units or are planning to do so. This takes much of the load of mental problems away from the provincial mental hospitals, which are meant for treatment of acute cases.

The number of general hospital psychiatric units in Ontario has increased 300 per cent in the past twelve years, and it will likely double again in the next five years. At present there are forty-six general hospital psychiatric units in existence or approved for construction in Ontario.

Forty new psychiatrists annually complete training in Ontario. (This is 10 per cent of the corresponding figure for physicians.) About twenty of these just balance the loss from the present total of about 400. There has been a steady increase in the ratio of psychiatrists to population during the past fifteen years, from 1:60,000 to 1:20,000 at present in Ontario. An arbitrary figure of 1:15,000 is often given as the goal. Allowing for population increase, this means a doubling of psychiatrists in Ontario over the next ten years.

Regarding the real need for acute treatment, there is no shortage of beds in the provincial mental hospitals. Shortage of accommodation outside these hospitals, however, increases the bed demands. There are not enough of any of the following services: halfway houses, retirees' foster homes, clinical and child psychiatrists, and social reform schools.

The treatment of children is most important, in order to keep them out of institutions in later life. The Children's Psychiatric Research Institute in London sees 900 patients each year. It has 100 beds, and patients usually stay for one to four months. It also operates a "liaison teacher" service (a member of the staff visits the child's classroom to try to discover some causes of the child's difficulties). There is also a special section for children at the Clarke Institute of Psychiatry in Toronto.

Psychiatric case registers indicate that there are much higher rates of mental illness in the lower socio-economic groups and that the treatment available is most inadequate. These people cannot afford outpatient treatment; they resist any such treatment; such services are often located at a great distance; and there is usually poor communication between their social class and that of the doctors. In Quebec, briefly trained volunteers for lower class patients are being employed experimentally.

TABLE A153
Membership in the Ontario Psychiatric Association, 1930-1966

	Honourary members	Members	Junior members	Associate members	Affiliate members
1966	—	289 ¹	Records not complete yet		
1960	5	110	46	12	4
1950	—	125	Records not detailed		
1940	—	100	Records not detailed		
1930	—	75	Records not detailed		

¹There are approximately 350 psychiatrists in Ontario doing active clinical work, administrative duties or retired.

SOURCE: Ontario Psychiatric Association.

A full member needs a certificate as a specialist in psychiatry from the Royal College of Physicians and Surgeons of Canada. A junior member is a qualified medical practitioner engaged in psychiatric work. An affiliate member is one who has a senior position in nursing, psychology, social work or a similar occupation. A life member is received on retirement. An honorary membership is given for exceptional service. The recipient may or may not be a practitioner.

TABLE A154

**Hospital Care for Psychiatric Illness in Provincial Mental Hospitals
in Ontario, 1964, 1965**

	1964	1965
First admissions	6,867	6,750
Readmissions	5,414	5,797
Total	12,281	12,547

SOURCE: Mental Hospital Statistics.

TABLE A155

Hospital Care for Psychiatric Illness in General Hospitals in Ontario, 1963-1967

	1963	1964	1965	1966	1967
No. of separations	21,477	26,635	28,524	30,807	33,399
Average stay in days	18.1	17.9	17.6	17.8	19.0
Total no. of hospital days for psychiatric care	389,000	477,000	502,000	548,000	635,000

SOURCE: Ontario Hospital Services Commission, 1967, *Annual Report (Statistical Supplement)* p. xiii.

Training

The training required is a four-year program following basic medical training. Four universities offer courses in this area: Toronto, Queen's, Western and Ottawa. In 1966 there were ninety-two postgraduates in all four schools; sixty-seven of them were at Western.

These are some of the ideas for changes in training. Some suggest a five-year course in psychiatry, psychology, sociology and anthropology for a "mental health therapist". In Quebec, general practitioners are offered bursaries of from \$10,000 to \$12,000 per year for three years of training in psychiatry, providing they practise for five years in the area from which they originate.

Psychiatric Nurses

Psychiatric nursing is an established profession in Great Britain and in parts of Western Europe. In Canada, schools of psychiatric nursing are operated in the four western provinces and graduates of these three and four-year programs are licensed under provincial Acts. There is no such program in Ontario.

Ontario gets some psychiatric nurses from western Canada and some from other parts of the world. Aides and attendants in this field are graduates of a two-year training program offered at most Ontario Mental Hospitals.

In the three-year program in the West, there is much practical experience in mental hospitals. The psychiatric nurses in Ontario suffer from low remuneration and a limited scope of utilization of their training, especially when compared with a registered nurse, who, with a mere ten to twelve weeks of psychiatric nursing preparation, gets a more senior position. Many psychiatric nurses leave Ontario or the profession.

According to the Ontario Psychiatric Nurses' Association, in 1964-1965 there was one psychiatric nurse to six patients in British Columbia and one registered nurse to thirty patients in Ontario.

Three per cent of all those employed in government psychiatric treatment facilities in Ontario are psychiatric nurses.

Psychologists

By provincial Act, one may practise only if registered. A certificate of registration is available only after completing a doctorate in the field. No one can hold himself up as a psychologist without the certificate unless he is a qualified medical practitioner, or in the service of the Canadian or Ontario government, or in a university. A psychologist can treat a mental disorder only on request or with a doctor. A psychologist cannot practise medicine, surgery or midwifery. Some European psychiatrists called "psychologists" are allowed exemption from some of these, but psychologists in Ontario now consider this exception inappropriate.

There are over 600 psychologists registered by the Ontario Board of Examiners in Psychology, 510 of whom reside in Ontario. In 1965 there were 378 in the Board's register (369 in permanent register; 324 practising in Ontario). The change is due to the adjustment of the regulations for registration.

Thirty-five years ago, almost all the psychologists in the province were in clinics or in hospitals. About 40 per cent are still located in the provincial hospital service.

There has been a decrease in adult mental hospital population, although there has been a marked increase for ten to fourteen year-olds. Only a very small number of state hospitals have separate wards for emotionally disturbed children. There is study going on now, but as yet there have been no special steps taken regarding children.

In 1965 there were fifty-one psychologists for all the elementary and secondary schools in Ontario. According to G. A. Ferguson²¹ there should be one psychologist for each 3,000 school children. By 1970 the school enrolment will be two million. Thus there will be a great increase in the number of educational psychologists needed.

²¹G. A. Ferguson, *Canadian Psychologist*, VA. 3a, 1962, pp. 82-87.

At present, the mental health services in Ontario consist of twenty-one Ontario Hospitals (including special hospitals and Ontario Hospital Schools), forty-four mental health clinics (community as well as provincial services), and twenty-one community hospitals (including two community mental hospitals). There are also twenty agencies employing psychologists in a clinical capacity including Children's Aid Societies, the Alcohol and Drug Addiction Research Foundation, juvenile courts, Boys' Village, reform institutions, and so on.

In the field of industrial psychology, forty-eight positions a year were found vacant, based on newspaper advertisements. Using this as an estimate, there will be 288 vacancies in Ontario by 1970.

The supply of research psychologists will increase by about 100 (thirty-eight Masters and sixty-six Doctorates) in Ontario over the next five years. This amounts to a ratio of about one research psychologist to twelve at the Master's level and about one to five overall.

By 1970, there will be eleven university graduate schools in Ontario offering psychology training.

TABLE A156

Graduate Schools in Ontario Offering Studies in Psychology, 1960-1970

	M.A.	M.Ps. ¹	Ph.D.
Carleton	1962 ²		1967
McMaster	*		1963
Ottawa	*	*	*
Queen's	*		1963
University of Toronto	*		*
O.C.E. (Toronto)	—		*
Waterloo	1964		1965
Waterloo Lutheran	1967		—
Western Ontario	*		*
Windsor	*		1967
York	1966		1967

¹Master of Psychology.

²Dates indicate the year of first graduates.

*Degrees granted prior to 1960.

SOURCE: Report of the Committee on Professional Affairs, *Ontario Psychological Association Quarterly*, "Manpower Needs in Psychological Services in Ontario, 1965-1970", Summer 1965.

About 50 per cent of the B.A. and M.Ps. graduates are expected to undertake further graduate work, and about 60 per cent of the Ph.D.'s are expected to go into teaching.

TABLE A157
Membership in the Ontario Psychological Association, 1950-1969

	1969	1965	1960	1950
Honourary life members	6	3	2	0
Full members (Ph.D.)	289	168	141	117
Associate members (M.A.)	20	147	52	29
Subscribers (interested persons)	—	41	43	—
Students (full-time graduate students)	39	22	21	5
	<u>354</u>	<u>381</u>	<u>259</u>	<u>151</u>

SOURCE: Ontario Psychological Association.

TABLE A158
Psychological Staff Requirements for Ontario Schools, 1965, 1970

	1965			1970	
	Staff ¹	Minimum ²	Vacancies ³	Minimum	Vacancies
Elementary	{ 60	411	{ 29	450	{ 71
Secondary		121		132	

¹Including separate school boards.

²Based on one psychologist per 3,000 pupils for total pupil enrolment in province.

³Would be higher, except that they do not advertise jobs that will never be filled.

SOURCE: See Table A 157.

Of the vacancies listed, forty-one stipulated the Ph.D. level and at least twenty-one others required registered psychologists.

TABLE A159
Psychological Staff Requirements of the Clinics in Ontario, 1965, 1970

	1965			1970	
	Staff	Minimum	Vacancies	Minimum ⁴	Proposed vacancies
Hospitals	66	100 ¹	50	124	84
Clinics	49	62 ²	8	77	44
Mental deficiency service	7	11 ³	8	14	11
Other agencies ⁵	<u>35</u>	—	<u>40</u>	—	<u>62</u>
Total	157		106		201

¹Minimum staff requirements for hospitals based on 0.4 intensive treatment beds per 1,000 population — one psychologist per fifty beds and eight continuing treatment beds per 1,000 population. One psychologist per 100 beds. Ratio based on present bed usage in Ontario.

²Minimum staff requirements for clinics based on one clinic team per 100,000 population.

³Mental deficiency services based on one psychologist per 600 patients.

⁴Based on estimated Ontario population of 7,700,000.

⁵Includes Children's Aid Societies, reform institutions, alcoholism research, juvenile courts, etc.

SOURCE: See Table A 157.

Even if all vacancies listed were filled, some of these services would not come up to minimum standards.

TABLE A160
Psychological Staff Requirements for Ontario in Counselling Area, 1965, 1970

Counselling agencies	1965			1970	
	Staff	Recommended	Vacancies	Recommended	Vacancies
Universities	7	46 ¹	6	100 ¹	23
High schools	—	—	—	1,308 ²	
Community services	7	—	7	200 ³	11
Other agencies	14 ⁴	—	12	—	20

¹Based on one counsellor per 1,000 students.

²Based on one counsellor per 300 students.

³Based on figures from present usage in Toronto agencies.

⁴Workmen's Compensation Board, Crippled Children's Centres, Jewish Vocational Service, Ontario Department of Welfare Rehabilitation Branch, etc.

SOURCE: See Table A 157.

TABLE A161
Principal Work Functions of Psychologists, Canada, 1967

Principal Function	Total No.	Percentage of Work Force
<i>Service</i>		
Administration (service settings) ¹	113	8.5
Clinical practice or psychological theory	105	7.9
Counselling practice	84	6.4
Other consulting	35	2.6
Computer service or statistical processing	7	0.5
Test administration or interpretation	215	16.3
Training and development of personnel (including executive)	37	2.8
Others in service settings ²	100	7.6
Subtotal	696	52.6
<i>Academic or research work</i>		
Administration (academic or research setting) ¹	33	2.5
Research	148	11.2
Teaching—psychology	201	15.2
Teaching—other	35	2.6
Technical or professional writing	8	0.6
Others in academic or research settings ²	38	2.9
Subtotal	463	35.0
<i>Other</i>		
General administration ¹	44	3.3
Other	18	1.4
No response	102	7.7
Subtotal	164	12.4
Total	1,323	100.0

¹Including committees.

²Information supplied by respondents was sufficient to identify setting but not specific principal work function.

SOURCE: M. Appley and J. Rickwood, *Canada's Psychologists*, study based on results of a survey on behalf of Canadian Psychological Association, June 1967.

Physiotherapists

In 1961, a meeting of the Ontario Society of Physiotherapy estimated that there was a shortage of 500 physiotherapists in Canada and that the shortage would increase by 100 each year. Since then the number of registered physiotherapists has increased by 127 each year, on the average, and the shortage is even more acute than was expected. The large centres are well served (for example, Toronto); however, other nearby centres, such as Oakville and Oshawa, are not. The majority of students at the University of Toronto come from within a forty-mile radius of the university and are reluctant to leave this area after graduation. Ontario is more fortunate than the other provinces. One-third of the physiotherapists in Canada are in Ontario; many move to this province after graduating from schools elsewhere in Canada.

The sole training facility in Ontario is the University of Toronto School of Rehabilitation Medicine. This is a three-year course requiring grade 13. The course grants only a diploma, but many elsewhere in Canada and the U.S. want or are taking a degree program. The University of Toronto course graduates eighty persons each year; some of these, however, are occupational therapists.

The University of Toronto is far from meeting current needs. In September of 1966 the school could take only 110 of 300 applications. They are understaffed by one-third now. The same staff are teaching the two-year teaching certificate course.

The attrition rate of physiotherapists by the end of the third year after graduation is 75 per cent.²² About 35 per cent of the physiotherapists in Ontario practise privately. There are 230 approved facilities in Ontario where physiotherapists may work.

Inventories

TABLE A162
Physiotherapists in Ontario, by Sex, 1969

Female	
Married	735
Single	379
Total	1,114
Male	145
Total	1,259

SOURCE: Board of Directors of Physiotherapy.

²²The Continuing Committee of the Canadian Conference on Physiotherapy, Submission to the Royal Commission on Health Services, April 1962, p. 11.

TABLE A163
Physiotherapists on the Official Register, Ontario, 1958-1969

1958	437
1959	451
1960	482
1961	492
1962	520
1963	546
1964	618
1965	712
1966	859
1967	971
1968	1,106
1969	1,259

SOURCE: Board of Directors of Physiotherapy.

From 1925-1935, physiotherapists were in the same classification as masseurs; after 1935 they had a separate classification. The number of registrants decreased during the 1940's because physiotherapists employed at hospitals were not required to register during these years. Since 1954, all who want to practise must register.

TABLE A164
Year of Graduation of the Physiotherapists in Ontario, 1968

Before 1953	307
1953	33
1954	35
1955	49
1956	24
1957	30
1958	44
1959	37
1960	38
1961	49
1962	41
1963	74
1964	69
1965	128
1966	75
1967	73
Total	1,106

SOURCE: Board of Directors of Physiotherapy.

TABLE A165
Active Members of the Ontario Society of Physiotherapy, 1930-1969

1969	47
1965	70
1960	55
1950	10
1940	12
1930	14

SOURCE: Ontario Society of Physiotherapy.

TABLE A166
**Year of Renewal of the 164 Ontario Physiotherapists Who Re-entered
after Being Inactive, 1967**

Date	Number of renewals
Before 1956	15
1956	0
1957	1
1958	2
1959	7
1960	8
1961	11
1962	13
1963	20
1964	18
1965	26
1966	37
1967	6
Total	164

SOURCE: Board of Directors of Physiotherapy.

TABLE A167
Source of Physiotherapists Registered in Ontario, January 1968

	No.	%
<i>Canadian</i>		
Graduates of the University of Toronto	531	—
Graduates of other Canadian universities	91	—
Other	47	—
Subtotal	669	60.5
<i>Foreign</i>		
Graduates from Great Britain, Australia, New Zealand, South Africa (by reciprocity)	329	—
Other—registered through examinations	108	—
Subtotal	437	39.5
Total	1,106	100.0

SOURCE: Board of Directors of Physiotherapy.

TABLE A168
Physiotherapists Still Working in Ontario According to their Year of Registration, 1967

Year of registration	No. of new registrants in that year	No. still working	Percentage still working
1961	86	34	39.5
1962	117	50	42.7
1963	111	78	70.2
1964	150	99	66.0
1965	192	127	66.0
1966	233	177	75.9

SOURCE: Board of Directors of Physiotherapy.

TABLE A169
Ratio of Registered Physiotherapists to Population of Ontario, 1951-1969

	1961	1962	1963	1964	1965	1966	1967	1968	1969
Total registered physiotherapists	492	520	546	618	712	859	971	1106	1259
Ratio per 10,000 pop.	.79	.82	.84	.93	.95	1.23	1.36	1.51	1.70
No. employed full time in hospitals	262	303	320	357	415	450	n/a	n/a	n/a
Ratio per 10,000 pop.	.42	.48	.49	.54	.61	.65	—	—	—
No. employed part time in hospitals	53	64	65	73	96	107	—	—	—
Ratio per 10,000 pop.	.09	.10	.10	.11	.14	.15	—	—	—

SOURCE: Board of Directors of Physiotherapy; and DBS, *Hospital Statistics*, Vol. III, Queen's Printer, Ottawa; 1961 to 1966.

TABLE A170
Percentage Increase of Physiotherapists Registered in Ontario, 1961-1969

	1961	1962	1963	1964	1965	1966	1967	1968	1969	Percentage increase 1961-1965	Percentage increase 1965-1969
No. registered physiotherapists	492	520	546	618	712	859	971	1,106	1,259	44.7	76.8
No. working full time in hospitals	262	303	320	357	415	450	n/a	n/a	n/a	58.4	n/a
No. working part time in hospitals	53	64	65	73	96	107	n/a	n/a	n/a	81.1	n/a

SOURCE: See Table A169.

In September 1964 the Ontario Hospital Services Commission extended coverage for out-patient physiotherapy by private practitioners. This plan was closed to new applicants in September 1965, at which time there were 222 approved private facilities made up as follows:

109 office facilities — some employing full-time and/or part-time therapists.

113 physiotherapists approved for home visiting only.

The effect of this service should be borne in mind when reading Tables A169 and A170.

TABLE A171

Vacancies in Physiotherapy Departments in General Hospitals in Ontario and the Staff that Were Obtained, November 1965¹

Size of hospital (No. of beds)	Other than Metro Toronto		Metro Toronto	
	Demand	Obtained	Demand	Obtained
700 plus	40	34	No problem	—
500-700	39	21	24	21
300-500	20.9	19	No problem	—
200-300	12	7	No problem	—
150-200	6	5	No problem	—
Total	125.4	90.5	24	21
Chronic and convalescent 100-300	15	21	Not surveyed	

¹Two-thirds of the hospitals in each size category were included in the survey.

SOURCE: See Table A166.

This survey did not include employers of physiotherapists not listed in the Canadian Hospital Directory, such as rehabilitation centres, children's centres, Canadian Arthritis and Rheumatism Society, private practice, and so on. This group employs 36.3 per cent of physiotherapists in Ontario.

Metropolitan Toronto had no real problem in staffing its physiotherapy departments in 1965. The vacancies outside Metropolitan Toronto occurred mainly in areas where, because of geographical location and other such factors, it was difficult to recruit staff.

Detailed vacancy lists will be available from the current survey due in May 1967.

TABLE A172

Full-time Enrolment in Physiotherapy and Occupational Therapy, Ontario, 1961-1968

	Queen's University	University of Toronto	University of Western Ontario
1967-68	28	309	6
1966-67	—	282	—
1965-66	—	270	—
1964-65	—	293	—
1963-64	—	295	—
1962-63	—	304	—
1961-62	—	232	—

SOURCE: DBS, *Survey of Higher Education, Part I*, Queen's Printer, Ottawa; November 1968.

TABLE A173
Graduates from the University of Toronto School of Physical and Occupational Therapy, 1961-1967

	No. Graduated	No. of Graduates still working in Ontario in 1967
1967	83	—
1966	78	27 ¹
1965	105	73
1964	76	39
1963	80	49
1962	58	20
1961	n/a	17

¹Internship periods end in November and December. Most 1966 graduates will register in 1967.

SOURCE: See Table A166.

TABLE A174
Place of Training and Year of Graduation of Physiotherapists on the Official Register, February 1968

Year of Graduation	U. of T.	C.I.P. other	Canadian universities other than U. of T.	United Kingdom	Australia N. Zealand S. Africa	Foreign countries	Total
Before 1940	30	6	—	18	—	16	70
1940-1950	92	11	10	62	—	15	100
1951	4	8	1	13	—	—	26
1952	6	4	—	9	1	1	21
1953	15	5	1	10	—	2	33
1954	17	1	2	11	1	3	35
1955	18	10	1	11	1	8	49
1956	10	2	2	6	—	4	24
1957	12	—	2	10	1	5	30
1958	10	—	6	16	1	11	44
1959	17	—	6	10	—	4	37
1960	14	—	3	14	3	4	38
1961	14	—	5	22	6	2	49
1962	17	—	4	11	3	6	41
1963	37	—	4	19	9	5	74
1964	40	—	8	13	5	3	69
1965	67	—	13	22	12	14	128
1966	52	—	11	3	4	5	75
1967	59	—	12	2	—	—	73
Total	531	47	91	282	47	108	1,106

SOURCE: Board of Directors of Physiotherapy.

Occupational Therapists

No licence is required to practise occupational therapy.

The training available in Ontario consists of the following. There is a three-year course at the University of Toronto under the Faculty of Medicine. The candidate then requires four months' clinical experience, two months' experience with physical disabilities. There are presently about 300 enrolled in the University of Toronto course but there is no way of telling how many will be occupational therapists. Also, since 1959 there has been a special course in occupational therapy in Kingston. It is an eighteen-month course, and an R.N. or diploma is required for admission. As at March 1967, the school had graduated sixty-eight people and there were thirteen enrolled in the course.

The other universities where training is available in Canada are the University of British Columbia, University of Alberta, University of Manitoba, University of Montreal, and McGill.

The 1961 census figure for both physiotherapists and occupational therapists is 1,128. The figures from the briefs to the Committee on the Healing Arts total approximately 986. Possibly formally untrained persons are practising.

Inventory

TABLE A175
Occupational Therapists in Canada and Ontario Who Are Members of the Canadian Association, 1934-1969

	Canada			Ontario			Number employed	
	Active	Inactive	Total	Active	Inactive	Total	Canada	Ontario
1969	744	435	1179	358	286	644	n/a	n/a
1965	503	361	864	252	215	467	461	223
1960	475	175	650	243	105	348	349	162
1950	257	30	287	157	21	178	256	172
1940	—	—	—	—	—	—	207	—
1934	—	—	120	—	—	60	96	—

SOURCE: Canadian Association of Occupational Therapists.

TABLE A176
Occupational Therapists in Ontario Who Are Members of the Ontario Association, 1950-1969

	Membership	Employed practising	Active	Inactive
1969	591	n/a	333	258
1965	467	223	252	215
1960	348	162	243	105
1950	177	172	157	21

SOURCE: Ontario Association of Occupational Therapists.

About seventy-two per cent of those practising in Ontario are members of either or both the Canadian and Ontario Associations. In 1965, the number practising in Ontario was 266; 192 of these were members of an Association. The Rehabilitation Committee of the Canadian Medical Association has estimated that there should be one occupational therapist for a population of 15,000. The 1966 population of Ontario was 6,731,000; thus 448 therapists were required in the province in that year. A substantial shortage results from marriage.

Remedial Gymnasts

The Association of Remedial Gymnasts of Ontario was founded in 1963. In 1963 there were thirty-three active members, or 75 per cent of all those practising. In 1967 there were thirty-six active members, all of whom were practising and were resident in Ontario. The armed services recommend one remedial gymnast for every 150 hospital beds.

TABLE A177
Establishments Employing Remedial Gymnasts in Ontario, 1966

	No. employed
Workmen's Compensation Board, Downsview	13
Department of Veteran's Affairs, Sunnybrook	6
Lyndhurst Lodge Hospital	2
Toronto Rehabilitation Centre	1
Toronto General Hospital	1 (needs more)
McKellar General Hospital, Fort William	1
Lakehead Rehabilitation Centre, Port Arthur	1
Red Cross Centre, Windsor	1
Ontario Hospital, Cobourg	1
Ottawa Civic Hospital	1
Westminster Hospital, London	4

SOURCE: Association of Remedial Gymnasts (Ontario).

TABLE A178
Establishments Prepared to Employ Remedial Gymnasts if Available, Ontario, 1966

St. John's Convalescent Hospital, Willowdale
Frontenac and District Rehabilitation Centre, Kingston
North Bay Civic Hospital

SOURCE: Association of Remedial Gymnasts (Ontario).

TABLE A179**Establishments Prepared to Employ Remedial Gymnasts if their Rehabilitation Program Expands, Ontario, 1966**

Stratford General Hospital
 Peel Memorial Hospital, Brampton
 North West General, Toronto
 Baycrest Hospital, Toronto

SOURCE: Association of Remedial Gymnasts (Ontario).

TABLE A180**Establishments that May Consider Employing Remedial Gymnasts Sometime in the Future, Ontario, 1966**

Hillcrest Hospital, Toronto
 Runnymede Hospital, Toronto
 St. Joseph's Hospital, Toronto
 St. Joseph's Hospital, Guelph
 St. Vincent de Paul, Brockville
 General Hospital, Sault Ste. Marie
 Kirkland and District Hospital, Kirkland Lake

SOURCE: Association of Remedial Gymnasts (Ontario).

TABLE A181**Establishments Having Definitely No Need for Remedial Gymnasts, Ontario, 1966**

Greater Niagara General, Niagara Falls	St. Joseph's Hospital, Sarnia
St. Catharines General Hospital	Ontario Hospital, St. Thomas
Queensway General Hospital	Cornwall General
Brockville General	Kingston General
Toronto East General	Thistlethorn Hospital
Hamilton Health Association	Guelph General
Hamilton General Hospital	St. Mary's General, Kitchener
Brantford General Hospital	Sarnia General
St. Joseph's Hospital, Chatham	St. Joseph's, London
North York Branson Hospital	St. Michael's, Toronto.

SOURCE: Association of Remedial Gymnasts (Ontario).

Masseurs

In 1953, the Board of Directors of Masseurs of Ontario was established to regulate and register all the masseurs. Anyone may practise without being registered, as long as he makes no therapeutic claim. The registered membership in the Board is as follows:

1968 — 385 (11 reside outside Toronto)
 1965 — 392
 1960 — 310
 1953 — 297

In 1967 there were seventy-four masseurs in the Society of Registered and Remedial Masseurs of Ontario and fifteen in the Ontario Association of Massage Therapy.

There are two schools of massage in Ontario. The Canadian College of Massage and Hydrotherapy, which was established in 1946, had ten students in 1961 (two failed) and in 1966 had forty-three students (five failed). The Ontario College of Massage (established in 1951) had fifteen students in 1966, five of whom failed. The requirement for the program is grade 10. It takes 540 hours of night courses (nine months) plus 500 clinical hours.

There has been a thoroughly inadequate inspection of the schools training masseurs. This situation is now being remedied.

Speech Therapists and Audiologists

To be a member of the Ontario Speech and Hearing Association, one must have one of the following: a Ph.D. in speech pathology or audiology, an M.A. in speech pathology, a diploma in speech pathology with three years of experience (one of them in Canada), or a B.A. with special considerations.

The only university training now existing in Ontario is the University of Toronto Division of Rehabilitation Medicine.²³ This course requires a B.A. for admittance. It then takes two years to become a speech pathologist. In 1966-1967, the school could accept only fourteen students because of very limited facilities. A gradual increase to twenty each year is planned.

Many sources suggest the need for care in this area. A survey conducted in England in 1964 showed that one or two per 1,000 children under five years of age had hearing loss severe enough to need special attention. In Ohio in 1966 5 per cent of the children in schools needed assistance in correcting speech defects. The Canadian Hearing Society (in the *Report of the Executive Director*, May 1966) stated that 10 per cent of the Canadian population suffer from some degree of hearing loss, and 350,000 need special care of some kind.

To be a hearing aid dispenser one requires an eighteen-month home-study course. At the end one becomes a "Certified Hearing Aid Audiologist". (The word "otologist" has no recognized meaning.) There is no regulatory licensing body to control hearing aid sales, and there have been abuses in this area — for example, the case of Beltone Co. in February of 1967.

In addition to the service provided by the speech therapists and audiologists in Canada, the Canadian Hearing Society provides a great deal of care. Each year it gives away over 600 hearing aids, and keeps about 1,000 persons who are deaf or hard of hearing in jobs. In 1965 the Society found 272 new jobs for the totally

²³In 1966, a one-woman staff instruction centre was set up in Sudbury. There are six students in this Sudbury Association for the Deaf and Hard of Hearing.

deaf and sixty jobs for the hard of hearing, and conducted 662 otological and audiometric examinations of patients in Canada as a whole. Their three offices in Ontario are in Toronto, London and Ottawa.

Inventory

TABLE A182

Number of Speech Pathologists and Audiologists in Ontario Who Are Members of the Ontario Association, 1960-1968

	1960	1966	1967	1968
Full members	29	53	65	74
Associates	24	29	35	32
Total	53	82 ¹	100	106

¹All of these were residing in Ontario. All but six were practising: fifty-two of the full members and twenty-four of the associates were practising. At another point in the Association's brief, these figures are given as fifty-five and thirty.

SOURCE: Ontario Speech and Hearing Association.

The Committee for the Survey of Hospital Needs in Metropolitan Toronto stated that in 1963 there were forty qualified speech therapists in Ontario. (Four per cent of the active treatment hospitals in Metro Toronto employed eight of them and two of the long-term hospitals employed one each. Also in Metro Toronto, Ontario Mental Health employed one part-time therapist. A total of 10.5 per cent of the forty were employed in Metro Toronto.)

TABLE A183

Educational Background of the Members of the Ontario Speech and Hearing Association, 1966

Ph.D. in speech pathology or audiology from an American university	4
M.A. or M.Sc. in speech pathology or audiology from an American university	15
B.A. or B.Sc. in speech pathology or audiology from an American university	7
Diploma in speech pathology or audiology from University of Toronto	16
L.C.S.T. (Licentiate of College of Speech Therapists— 3-year British training course) Australian Garg.	18
B.A. grad. in Togopedios from S. Africa	—
M.D.'s (specialty in otolaryngology)	2
P.Eng. in physics of sound	1

SOURCE: Ontario Speech and Hearing Association.

TABLE A184
Number of Speech and Hearing Services in Ontario, 1966

Service	Number
Clinics and hospitals	26
Crippled children's centres	7
Rehabilitation centres	7
Audiological evaluation and treatment centres	14
Educational services	27

SOURCE: Ontario Speech and Hearing Association, Brief to the Committee on the Healing Arts, October 1966.

Dietitians

The Ontario Dietitians Association is the registering body in Ontario, but one can still practise as a dietitian without being registered.

The Committee for the Survey of Hospital Needs in Metropolitan Toronto found that for 1962-1963, the ratio of dietitians to hospital beds for Metro Toronto was 1:119.7. This is high relative to the rest of Ontario, but there was still a shortage of fourteen dietitians in Metro hospitals.

There are four universities in Ontario where this training may be obtained. Ottawa and Western have three-year courses; the Universities of Toronto and Guelph have four-year courses. Ryerson also offers a three-year course for dietary assistants. There is a food supervisor course which can be taken in Toronto or London, conducted by the area Boards of Education. A twelve-month course can be taken from the following hospitals: Hospital for Sick Children, St. Michael's, Toronto Western, and Ottawa Civic. A new secondary school course is offered now also.

TABLE A185
Members of the Canadian Dietetic Association, 1935-1969

1969	1,669
1968	1,568
1967	1,576
1966	1,560 ²
1965	1,428
1960	1,135
1950	757
1940	528
1936	298
1935 ¹	28

¹The Association was founded in this year.

²Seventy-five per cent of these are directly concerned with the healing arts — i.e., in hospitals, in health services, as faculty members.

SOURCE: Canadian Dietetic Association.

TABLE A186
Number of Dietitians in Ontario Who Are Members of the Ontario Dietetic Association, 1960-1969

	Full members (active)	Number working
1969	428	352
1966	379	334
1965	359	350
1960	368	361

SOURCE: Ontario Dietetic Association.

As seen in Table A186, the 1965 membership figure is 359. The Canadian Dietetic Association gives the figure 619 for Ontario, and says that 80 per cent (495) are professionally employed. According to the Canadian census there were 829 "dietitians" employed in Ontario in 1961.

TABLE A187
Dietitians in Ontario by Place of Employment, 1966

Place of employment	Number	Percentage
Hospitals	198	46.3
Business	54	12.6
Universities and schools	55	12.8
Government	48	11.2
Not employed or retired	73	17.1
	428	100.0

SOURCE: Ontario Dietetic Association.

Training

TABLE A188
Enrolment in the University of Toronto Faculty of Food Sciences, 1962-1970

	Entering		Graduating	Total students
1962	30	1966	27	96
1961	30	1965	17	99
1960	19	1964	15	90
1959	21	1963	17	85
1958	23	1962	24	92
Projections				
1966	28	1970	25	95
1967	35	1971	32	100
1968	40	1972	36	115
1969	45	1973	40	130
1970	50	1974	43	140

SOURCE: University of Toronto Faculty of Food Sciences.

The university also offers a one-year postgraduate program. The staff consists of one dean, four associate professors, three assistant professors, six regular professors, and one part-time lecturer.

TABLE A189
Number of Schools for Dietitians by Province, 1969

	Number of universities offering instruction	Number of hospitals offering an interne-like program
Ontario	4	8
British Columbia	1	2
Alberta	1	3
Saskatchewan	1	1
Manitoba	1	2
Quebec	3	4
Nova Scotia	3	2
New Brunswick	2	0
Prince Edward Island	1	0
Newfoundland	0	0
Total	17	22

SOURCE: Canadian Dietetic Association.

TABLE A190
Ontario Dietetic Association, Membership by Region, March 1969

Region number		
1	(London)	47
2	(Hamilton, Guelph)	51
3	(Toronto)	234
4	(Peterborough, Kingston)	13
5	(Ottawa)	43
6	(West Central Ontario)	11
7	(Northern Ontario)	14
8	(Lakehead)	3
9	(Outside Ontario)	12
Total		428

SOURCE: Ontario Dietetic Association.

Medical Record Librarians

There are three schools in Ontario that are approved by the Canadian Association of Medical Record Librarians: St. Michael's Hospital, Hotel Dieu in Kingston, and Ottawa General. (There are eight other schools elsewhere in Canada: two in

British Columbia, one each in Alberta, Saskatchewan, Manitoba, and Nova Scotia, and two in Quebec.) The Ontario course is twelve months, involving both theory and practice. American schools have longer training periods and higher entrance requirements (some college education or a degree is necessary). Many librarians in British Columbia hold degrees.

In 1953 in Ontario there was a two-year extension course, but this was discontinued in 1963.

Many feel that smaller hospitals do not need a specialized medical records librarian. A two-year extension course for technicians and clerks was begun in 1962. Medical typists and stenographers are needed. One can practise as a medical record librarian without being "registered".

Inventory

TABLE A191

Number of Medical Record Librarians in Ontario Who Belong to the Ontario Association, 1963-1968

	1963	1964	1965	1966	1967	1968
Honorary members	2	2	2	2	2	2
Active members	163	201	207	214	216	232
Associate members	66	94	124	160	190	278
Inactive members	—	4	4	4	4	4
Total	231	301	337	380	412	508

SOURCE: Ontario Association of Medical Record Librarians.

TABLE A192

Required Numbers of Medical Record Librarians Working in Hospitals

Estimate made by	Estimate	
Canadian Association of Medical Record Librarians	1 for every 100 beds	
Canadian Hospital Association	1 for 150 beds	
Ontario Association of Medical Record Librarians	0-150 beds	1
	150-300 beds	2
	300-500 beds	3
	each additional 200 beds	1

SOURCE: Briefs to the Committee on the Healing Arts.

TABLE A193**Number of Public Hospitals in Canada that Employed Professionally Qualified Medical Record Librarians, 1966**

Hospital size and type	Number of hospitals	No. of professionally qualified medical record librarians	
		Full time	Part time
General hospitals			
Less than 100 beds	583	103	18
100-299 beds	191	197	10
Over 500 beds	95	257	7
Chronic, convalescent, rehabilitation	104	21	13
Other	54	8	1
Total	1,027	586	49

SOURCE: DBS, *Hospital Statistics*, Vol. III, Queen's Printer, Ottawa, November 1968, Tables 1 and 7.

Training**TABLE A194****Medical Record Librarians: Number of Graduates from Ontario Schools, 1967**

School	No. of years in operation	Enrolment 1967	No. of graduates (including 1967)
St. Michael's Hospital, Toronto	30	15	252
Hotel Dieu, Kingston	23	6	59
Ottawa General	9	7 ¹	66
Total	62	28	377

¹In 1966 there were eighty applicants.

SOURCE: Ontario Association of Medical Record Librarians, Brief to the Committee on the Healing Arts, p. 5.

Limitations exist because of very few chances at practical experience.

Professional Social Workers

The training of a professional social worker consists of a two-year university post-graduate program, leading to a Master's degree. The practice is not yet legally controlled; nor is the use of the title protected.

The membership in the Ontario Association of Professional Social Workers is as follows:

1969	1,155
1966	1,100
1965	1,006

All of the 1,006 members in 1965 resided in Ontario. Forty-five were retired or not in practice, and another forty-five were students.

According to the Canadian census, the 1961 figure for "social welfare workers" in Ontario was 4,173; this indicates that very many without the degree are practising.

Neither the universities nor the Ontario Association have studied the projected demand for these graduates. In the publication "Who Cares", however, it is claimed that there is a totally inadequate supply due to unprecedented expansion in the services in this area.

The Committee for the Survey of Hospital Needs in Metropolitan Toronto recommended (on page 16 of its study, *Education and the Provision of Personnel*) that each hospital of over 100 beds establish a social work department, and staff it with at least one qualified social service worker.

There are three universities which offer training in Ontario: the University of Toronto, the University of Ottawa, and Waterloo Lutheran University. In 1965-1966, the University of Toronto School of Social Work had 146 graduates; for 1967-1968 they expected 169, and for 1970-1971 they expect forty and fifty respectively. The school at Waterloo Lutheran opened in 1966.

For the past two years there has been a course for welfare workers at Ryerson Polytechnical Institute.

Other universities offering this training in Canada are British Columbia, Manitoba, Montreal, Laval, McGill and the Maritime School of Social Work.

TABLE A195
Geographic Location of the Membership in the Ontario Association of Professional Social Workers, 1965

Branch ¹	Active membership
Metropolitan Toronto	over 500
Ottawa	140
London Area	49
Essex County	42
Kingston Area	14
Quinte-Kawartha (Peterborough)	19
Central Ontario (Hamilton to Niagara)	88
Non-branch members (scattered)	38

¹A Wellington-Waterloo Branch is just being formed.

SOURCE: Ontario Association of Professional Social Workers, mimeographed material.

Pastoral Education: Ministers as Mental Health Chaplains

The Joint Commission on Mental Health in the United States has reported that 42 per cent of the people who are mentally disturbed go first to a clergyman for help (29 per cent go first to their family doctor; 19 per cent go first to a psychia-

trist; and 10 per cent go first to a social agency). The Midtown Manhattan Study²⁴ claimed that 20 per cent of the population was impaired in adult role functioning, 60 per cent suffered from mild distress, and 20 per cent were "well".

The clergyman is equipped to deal with these problems through a course of study known as clinical or supervised pastoral education. Such courses were started in 1930 in the United States, and there are now over 200 training centres in hospitals, reform institutions and rehabilitation centres all over the United States.

Three schools in Canada (Waterloo, McMaster and Acadia) now require a minimum of six weeks' training for their undergraduates. Similar programs are also beginning in Vancouver, Saskatoon, Winnipeg, and Halifax, where there are medical schools and teaching hospitals. The McMaster course is affiliated with the Hamilton Civic Hospitals and the Ontario Hospital, Hamilton. (Part-time courses, taken over four or five years are also available there.) The Toronto Institute of Pastoral Training which serves students from the four University of Toronto Colleges works with the Toronto General Hospital, Lakeshore Psychiatric Hospital, and the Ontario Training Centre, Brampton. Queen's and the Ontario Hospital in London are currently promoting similar programs. Canada will be dependent for several years upon the United States centres for the training of supervisors due to inadequacy of staff and facilities.

As of August 1966, 394 persons of diverse religions have taken part in the McMaster program.

The Canadian Council for Supervised Pastoral Education had 125 full and associate (not yet fully qualified, non-voting) members in December 1966. Supervisors must have three years of full-time pastoral responsibility.

TABLE A196

Pastoral Education: Graduates from the McMaster Program by Length of Course Taken as at August 31, 1966

Length of courses taken	Number graduating
6 weeks	239
12 weeks	99
58 weeks	20
18 weeks	19
30 weeks	7
36 weeks	10
All courses	394

SOURCE: Canadian Council for Supervised Pastoral Education, Brief to the Committee on the Healing Arts.

The Ontario Council of St. John Ambulance

The St. John Ambulance teaches first aid, home nursing and child care to the public. It also renders first aid directly to the public. There are forty branches

²⁴Leo Strole, *Mental Health in the Metropolis, Midtown Manhattan Study*, Vol. 1.

and 170 divisions in Ontario. The Ontario Council has a budget of half a million dollars.

In 1965, the Brigade trained 40,195 persons in Ontario. In addition to this, an additional 28,000 were trained in artificial respiration and 50,000 in water safety through cooperation with the Ontario Safety League's Better Boating Program. They have a working agreement with the Red Cross to prevent overlapping of first aid training.

Additional instructors (nurses) are required, particularly for the home nursing and child care.

The Brigade, which provides the volunteer first aid service, is composed of 4,000 trained personnel, who in 1965 performed 230,000 hours of service to the public free of charge. It operates jointly with the Ontario Motor League first aid posts.

Financing is provided by the Metropolitan United Community Fund, the Ontario government, and the Metropolitan Toronto government.

TABLE A197
Branches of the Order of St. John in Ontario, 1967

Arnprior	Milton
Atikokan	Niagara Falls
Belleville	North Bay
Brampton	Oakville
Brant County (Brantford) ¹	Orillia
Brockville	Oshawa
Burlington	Pembroke
Cobourg	Peterborough
Cornwall	Porcupine (Timmins) ⁴
Dryden	Renfrew
Fort Frances	St. Thomas-Elgin (St. Thomas) ¹
Goderich	Sarnia
Guelph	Sault Ste. Marie
Hamilton	Stratford
Kenora	South Peel (Port Credit) ²
Kitchener-Waterloo	Sudbury
Lakehead (Fort William and Port Arthur) ³	Toronto
Lincoln County (St. Catharines) ¹	Whitby
Listowel	Windsor
London	Woodstock

¹These branches cover the county they are in.

²South Peel Branch covers the southern half of Peel County.

³Lakehead Branch covers Fort William and Port Arthur.

⁴Porcupine Branch covers Timmins and South Porcupine.

SOURCE: St. John Council, Ontario.

TABLE A198

Ambulance Divisions, St. John Council, Ontario, 1967

London (Forest City) Ambulance Division
West Toronto Ambulance Division
Hamilton (Canadian Westinghouse) Ambulance Division
Owen Sound Ambulance Division
Windsor Central Ambulance Division
Fort William Ambulance Division
Timmins Ambulance Division
Peterborough Ambulance Division
Eastern Toronto Ambulance Division
Hamilton (Steel Co. of Canada) Ambulance Division
Sarnia Ambulance Division
St. Thomas Ambulance Division
Ingersoll Ambulance Division
London (John Labatt) Ambulance Division
Port Arthur Central Ambulance Division
Kingston (Limestone City) Ambulance Division
Woodstock Ambulance Division
Sault Ste. Marie (Algoma Steel) Ambulance Division
Kitchener-Waterloo Ambulance Division
Toronto (Lakeshore) Ambulance Division
Brantford (Brant) Ambulance Division
Welland Ambulance Division
Cornwall (Stormont) Ambulance Division
Niagara Falls Ambulance Division
Barrie Ambulance Division
Eastern Porcupine Ambulance Division
St. Catharines (McKinnon Industries) Ambulance Division
Wallaceburg Ambulance Division
Toronto (Swansea) Ambulance Division
Toronto (East York) Ambulance Division
Hamilton (Central) Ambulance Division
Hamilton (N. Slater Co. Ltd.) Ambulance Division
Toronto (Humewood) Ambulance Division
Sudbury (Nickel Belt) Ambulance Division
St. Catharines Ambulance Division
Windsor East Ambulance Division
Galt Ambulance Division

SOURCE: St. John Council, Ontario.

TABLE A198 (Continued)
Ambulance Divisions, St. John Council, Ontario, 1967

Guelph Ambulance Division
Oshawa Ambulance Division
Stratford Ambulance Division
Simcoe (Lions') Ambulance Division
Chatham Ambulance Division
Peterborough (Kawartha) Ambulance Division
Arnprior Ambulance Division
Tillsonburg Ambulance Division
St. Catharines (Thompson Products) Ambulance Division
Hamilton (Underwood) Ambulance Division
Orillia Ambulance Division
Windsor (Dosco) Ambulance Division
Hanover Ambulance Division
Belleville (Quinte) Ambulance Division
Toronto (Dominion) Ambulance Division
Scarborough Ambulance Division
Toronto (Etobicoke) Ambulance Division
Oshawa (General Motors) Ambulance Division
Pembroke (Algonquin) Ambulance Division

SOURCE: St. John Council, Ontario.

TABLE A199
Nursing Divisions, St. John Council, Ontario, 1967

Toronto Central Nursing Division
West Toronto Nursing Division
Hamilton Central Nursing Division
London Nursing Division
St. Thomas Central Nursing Division
Peterborough Nursing Division
Fort William Nursing Division
Hamilton (Steel Co. of Canada) Nursing Division
Port Arthur (Ellen Douglass) Nursing Division

SOURCE: St. John Council, Ontario.

TABLE A199 (Continued)**Nursing Divisions, St. John Council, Ontario, 1967**

Kingston Nursing Division
 Windsor Nursing Division
 Kitchener-Waterloo Nursing Division
 Timmins Nursing Division
 Pembroke Nursing Division
 Niagara Falls (Cataract) Nursing Division
 Woodstock Nursing Division
 Sarnia Nursing Division
 Owen Sound Nursing Division
 Welland (Victory) Nursing Division
 Sault Ste. Marie Nursing Division
 Barrie Nursing Division
 Toronto (Beaches) Nursing Division
 Windsor (Border) Nursing Division
 Picton Nursing Division
 Cornwall (Cornwallis) Nursing Division
 Belleville Nursing Division
 Toronto (Humewood) Nursing Division
 North Toronto Nursing Division
 Brantford (Brant) Nursing Division
 St. Catharines Nursing Division
 Guelph Nursing Division
 Oshawa Nursing Division
 Windsor (Hopewell) Nursing Division
 Stratford Nursing Division
 Galt Nursing Division
 Renfrew Nursing Division
 Peterborough (Kawartha) Nursing Division
 Simcoe (Norfolk) Nursing Division
 Orillia (Mariposa) Nursing Division
 Arnprior Nursing Division
 Delhi Nursing Division
 Hamilton (Mohawk) Nursing Division
 Hanover Nursing Division
 Windsor (Towers) Nursing Division
 Scarborough Nursing Division
 Toronto (Etobicoke) Nursing Division
 Wallaceburg Nursing Division
 Toronto (Margaret MacLaren) Nursing Division

TABLE A200
Combined Divisions, St. John Council, Ontario, 1967

Parry Sound (Sir Frederick Banting) Combined Division
Carleton Place Combined Division
Port Colborne & Humberstone Combined Division
Tilbury Combined Division
Leamington Combined Division
Oakville Combined Division
Acton Combined Division
Schreiber Combined Division
Fergus Combined Division
Goderich Combined Division
Delhi Combined Division
Essex District Combined Division
Burlington Combined Division
Paris Combined Division
Trenton Combined Division
Whitby Combined Division
Brockville (Thousand Islands) Combined Division
Listowel Combined Division
Milton Combined Division
Brampton Combined Division
Port Credit (South Peel) Combined Division

SOURCE: St. John Council, Ontario.

TABLE A201
Cadet Ambulance Division, St. John Council, Ontario, 1967

West Toronto Cadet Ambulance Division
Hamilton (Canadian Westinghouse) Cadet Ambulance Division
Timmins Cadet Ambulance Division
Welland Cadet Ambulance Division
London (William Loveday) Cadet Ambulance Division
St. Catharines (George Macnoe) Cadet Ambulance Division
Oshawa Cadet Ambulance Division
Windsor (W. D. Lowe) Cadet Ambulance Division
Sault Ste. Marie (Lock City) Cadet Ambulance Division
London (Anniversary) Cadet Ambulance Division
Peterborough Cadet Ambulance Division
Belleville (Quinte) Cadet Ambulance Division
Scarborough Cadet Ambulance Division
Brantford (O'Connell) Cadet Ambulance Division
Downsview Cadet Ambulance Division
Whitby Cadet Ambulance Division
Sudbury Cadet Ambulance Division

SOURCE: St. John Council, Ontario.

TABLE A202
Cadet Nursing Division, St. John Council, Ontario, 1967

Hamilton (Steel Co. of Canada) Cadet Nursing Division
Kingston Cadet Nursing Division
Timmins Cadet Nursing Division
Sudbury Cadet Nursing Division
Pembroke Cadet Nursing Division
Welland (Victory) Cadet Nursing Division
Belleville Cadet Nursing Division
London (Elizabeth Labatt) Cadet Nursing Division
St. Catharines (Centennial) Cadet Nursing Division
Fort William (Eleanor Paterson) Cadet Nursing Division
Guelph Cadet Nursing Division
Windsor (Frontier) Cadet Nursing Division
Remington Park Cadet Nursing Division
Stratford Cadet Nursing Division
Sault Ste. Marie (Steelton) Cadet Nursing Division
Renfrew Cadet Nursing Division
Toronto (East York) Cadet Nursing Division
Windsor (Riverside) Cadet Nursing Division
Arnprior Cadet Nursing Division
Peterborough (Lift Lock) Cadet Nursing Division
Hamilton (Mohawk) Cadet Nursing Division
Brantford (O'Connell) Cadet Nursing Division
Scarborough Cadet Nursing Division
Hamilton (Bethesda) Cadet Nursing Division
Whitby Cadet Nursing Division
Downsview Cadet Nursing Division
North Toronto Cadet Nursing Division
Oshawa Cadet Nursing Division
Sudbury Cadet Nursing Division

SOURCE: St. John Council, Ontario.

TABLE A203
Divisions Through Ontario, St. John Council, 1967

	No.
Ambulance Divisions	56
Nursing Divisions	48
Combined Divisions	21
Cadet Ambulance Divisions	17
Cadet Combined Division	1
Cadet Nursing Divisions	29
Crusader Nursing Division	1
Combined Sections	2
	<hr/>
	175

SOURCE: St. John Council, Ontario.

The Ontario Association of Medical Clinics

The Association represents about thirty clinics in Ontario and more than 450 physicians. There are three categories of membership: a member group or clinic (whose staff must include five or more full-time physicians, including an internist and a general surgeon); an associate member group (which must employ at least three full-time physicians); and an affiliate member group (which must employ at least two full-time physicians).

TABLE A204
Medical Clinics and Staff in Ontario Which Are Members of the Ontario Association of Medical Clinics, 1969

Clinic name	Location	Number of staff (doctors)	
		General practitioners	Specialists
Albany Clinic	Toronto	9	8
Atikokan Clinic	Atikokan	3	0
Bloor Clinic	Toronto	5	3
Brantford Clinic	Brantford	4	5
Brockville Clinic	Prescott	1	2
Carruthers Clinic	Sarnia	4	10
Etobicoke Centre	Islington	6	1
Fort Frances Clinic	Fort Frances	9	3
Fort William Clinic	Fort William	4	7
Jarvis Clinic	Scarborough	1	4
Kirkland Group	Kirkland Lake	4	4
Lake of the Woods Clinic	Kenora	4	0
Lockwood Clinic	Toronto	0	15
McGregor Clinic	Hamilton	0	25
The Medical Centre	Peterborough	3	15
Medical Diagnostic Group	Toronto	0	5
Oshawa Clinic	Oshawa	9	21
Parkdale Clinic	Toronto	6	4
The Peterborough Clinic	Peterborough	3	19
The Port Arthur Clinic	Port Arthur	11	22
Rynard Clinic	Orillia	4	7
St. Catharines Centre	St. Catharines	4	3
St. Clair-Dufferin Centre	Toronto	8	6
Simcoe Group	Barrie	8	1
Smith Clinic	Hawkesbury	3	2
The Spence Clinic	Fort William	0	9
Sudbury Clinic	Sudbury	4	2
Thorold Clinic	Thorold	6	3
Woodview Park Centre	Weston	5	2
Brunswick Diagnostic Clinic	Toronto	0	6
Medical Centre	Leamington	3	4
Raxlen Clinic	Toronto	9	12
Strathroy Clinic	Strathroy	3	1
Tavistock Group	Tavistock	6	0

SOURCE: Ontario Association of Medical Clinics.

Special Healers of Ontario

The services of these persons are available to everyone, free of charge. In the United Kingdom, spiritual healers have had permission since 1960, from the hospital authorities and management committees, to visit the sick in hospitals. They have entry in over 1,600 hospitals now.

There are four organizations that must be mentioned in this field. The Canadian Section of the National Federation of Spiritual Healers is a section of the English organization. Its membership is given in a chart below. It offers two courses to all members: anatomy and spiritual healing.

The National Spiritualist Association of Canada does not keep a register of healers practising in Ontario, but claims that, under federal charter, only those who are members of the Association, with Healers' Cards, are allowed to practise.

The United Spiritualist Church of Ontario gives no information regarding members. There are four branch churches: two in Toronto, one in Brantford, and one in Oshawa.

The membership in the Spiritualist National Union of Canada is given in a chart below.

TABLE A205
Membership in the Canadian Section of the National Federation of Spiritual Healers, Ontario, 1965

	Ontario membership 1965	Number practising in Ontario
Full healers ¹	27	25
Probationary healers ²	11	9
Associate healers ³	67	64

¹Have actively demonstrated and proved their abilities.

²Are developing but have not reached their full talents.

³Interested persons.

SOURCE: Spiritual Healers of Ontario, Brief to the Committee on the Healing Arts.

TABLE A206
Membership in the Spiritualist National Union of Canada, 1960, 1965

	1960		1965	
	Canada	Ontario	Canada	Ontario
Subscribing members (a believer)	126	—	—	—
Accredited workers	29	18	18	12
Ordained ministers ("Reverend")	30	11	11	6

SOURCE: Spiritual Healers of Ontario, Brief to the Committee on the Healing Arts.

Motivation Study

The Provincial Hypnosis Act of 1960-1961 is quite inadequate, since it does not define hypnosis or define the training needed. Today there are five laymen practising in Ontario under this Act.

In the other provinces, there is no Act similar to that of Ontario's. In Alberta, as of 1961, hypnotists must be licensed. Hypnosis is prohibited in advertising and entertainment. According to federal law, the fraudulent use of hypnosis carries a fine of up to \$500 or a six-month jail term, or both.

Some special legislation exists in the United States. The use of hypnosis in certain areas of medicine and dentistry is allowed in numerous states if the hypnotist is acting as a technician to the physician or dentist. Other laws allow hypnotists to practise if the patient has been referred by a physician.

In 1960 the Canadian Medical Association special committee study made the following recommendations:

- 1) Lay persons may not hypnotize anyone.
- 2) Hypnosis may be performed only by those who are professionally qualified.
- 3) Hypnosis must never be a single technique; it should be performed under the supervision of a physician.

Christian Scientists

There are over 3,300 branch churches and societies in the world, of which eighty-eight are located in Canada. There is only one accredited Christian Science Sanatorium in Canada, in Victoria, B.C. Steps are under way at present to establish one in Ontario. These institutions are run by and for Christian Scientists on a strictly non-profit basis.

The preparation of a Christian Science practitioner "consists of years of daily study and prayer, spiritual discipline and exercise".²⁵ He does not heal. He prays and helps the one in distress to understand God better, so that a greater communication with God will result in healing. Healing is not a technique to be learned, but a result of Christian life. Each branch church must have at least one accredited practitioner.

The medicare law in the U.S. recognizes Christian Science sanatoria for benefits.

Children with Learning Disabilities

The incidence of handicap for learning in the general population is at least 5 per cent. This represents the largest incidence of handicap or exceptionality in the

²⁵Christian Science Committee on Publications, Brief to the Committee on the Healing Arts.

population. The Department of Speech and Language Pathology of Northwestern University reports that 10 to 15 per cent of children have perceptual problems. The Neuropsychiatric Institute at the University of Michigan claims that "at least 10 per cent of children of average intelligence at school in the United States suffer from severe reading disorder originating from disturbances of perception". About 300,000 children in Ontario suffer from these handicaps in various degrees. Those with obvious handicaps go into special classes; those who are not recognized simply struggle in normal school.

The Ontario Association for Children with Learning Disabilities was formed by the parents of such children in 1963. It is a non-profit organization with a total membership of 3,000. About one-third of these members are professional workers in their field.

According to the Association, there are no professionals practising in Ontario who are fully trained in diagnosing, teaching, and educating these children. Proper treatment requires language work, physio and occupational therapy, and optometric, neurological, psychological, and medical treatment. At present there is either complete lack of, or only "token", services in this area. Even when problems are found by physicians they are not referred to other professionals or to educators.

Several crippled children's centres have been diagnosing and treating in this area. The Kingston General Hospital summer project with the perceptually handicapped, and the Clarke Institute of Psychiatry in Toronto (in their general course for the last two or three years) are examples of these services.

There are no refresher courses available for practitioners in this field, and there have been no conferences or symposiums on the perceptually handicapped. There is no financial support from the Ontario Hospital Services Commission, unless physical lesion of body tissue can be shown. In 50 per cent of the cases of minimal brain dysfunction, such deterioration cannot be localized, although doctors "generally agree" that there is organic disorder.²⁶ This means that these cases cannot use the services of the twenty-two Ontario crippled children's centres. (It is here that most of the very few professionals trained in minimal brain dysfunction are located. Primarily they treat cerebral palsy victims.)

Ontario Cancer Treatment and Research Foundation

The Ontario Cancer Treatment and Research Foundation maintains and operates Princess Margaret Hospital, a provincial hospital with facilities for cancer research, diagnosis and treatment. The Foundation does clinical research, but the National Cancer Institute of Canada is now responsible for basic work in cancer research. The Foundation has provided a biopsy service to all practitioners in Ontario.

²⁶The Ontario Association for Children with Learning Disabilities, Brief to the Committee on the Healing Arts.

Before 1951 this service was free to the practitioner. Since 1951 practitioners must pay pathologists for such services.

The Foundation has established, maintained, and supported clinics for the treatment of cancer by radiotherapy. These are found in areas of population of at least 600,000, as they need this size of population to be efficient.

The Foundation has set up standards for radiation therapy centres. By these standards, the staff requirements of each centre are

- 1 director (a radio-therapist with 5 years' experience),
- 1 associate director (a radio-therapist),
- 1 junior radio-therapist,
- 2 resident fellows,
- 1 physicist,
- 1 fellow,
- 1 laboratory technician,
- 1 technicians' supervisor (with both R.N. and R.T.),
- 3 registered nurses,
- 1 medical record librarian,
- 1 statistical clerk,
- 1 fully qualified social worker,
- A new machine shop.

Canadian Arthritis and Rheumatism Society, Ontario Division

In Ontario now, there are twenty rheumatologists, twelve of whom are in Toronto. A rheumatologist must be a physician or specialist in internal medicine and have two or more years in arthritis training and research. The recommended ratio of rheumatologists for the province is 1:100,000. This would require a three-fold increase in Ontario.

There are thirty professional workers employed by the Society in Ontario.

The rheumatic diseases rank second only to cardiovascular diseases among the leading causes of physical disability, as shown in the Canadian Sickness Survey, 1951. More than one million Canadians are affected by arthritis and other rheumatic diseases. Of these, 285,000 are disabled; 63,000 are totally or severely disabled. Of those disabled by arthritis and other rheumatic diseases, 68 per cent are working age (eighteen to sixty-four).

Eighty-two per cent of the cases dealt with by the Canadian Association were "improved" or "much improved". The Association reaches communities embracing over 50 per cent of the nation's population.

TABLE A207

Health Services as a Percentage of Community, Business and Personal Service Industries, Canada and the Provinces, 1941, 1951, 1961

	1941	1951	1961
Canada ¹	13.077	19.744	22.289
Newfoundland	—	21.016	25.159
Prince Edward Island	12.208	20.989	26.475
Nova Scotia	13.276	19.619	24.400
New Brunswick	13.015	21.270	25.925
Quebec	10.368	15.393	19.009
Ontario	15.026	20.922	22.566
Manitoba	13.595	21.628	24.389
Saskatchewan	11.698	23.983	27.508
Alberta	12.988	20.604	23.115
British Columbia	16.021	24.383	23.964

¹Excludes Yukon and Northwest Territories; includes Newfoundland in 1951 and 1961.

SOURCE: DBS, *Census of Canada, 1961*, Bulletin SL-1, Queen's Printer, Ottawa, 1966, Table 12.

TABLE A208
Physicians per 10,000 Persons, an International Comparison, 1950, 1955, 1960

1950 (Average 1949-1951)			1955 (Average 1954-1956)			1960 (Average 1959-1961)		
Rank	Country	Physicians per 10,000 persons	Rank	Country	Physicians per 10,000 persons	Rank	Country	Physicians per 10,000 persons
1	Israel	23.00	1	Israel	22.61	1	Israel	24.88
2	Austria	15.93	2	Austria	18.10	2	Austria	18.32
3	U.S.A.	14.50	3	U.S.A.	14.62	3	West Germany	14.58
4	West Germany	14.00	4	Switzerland	14.25	4	U.S.A.	14.47
5	Switzerland	13.45	5	West Germany	14.20	5	Denmark	14.43
6	New Zealand	12.22	6	New Zealand	14.06	6	Switzerland	14.36
7	Denmark	11.80	7	Denmark	12.67	7	Italy	13.90
8	Canada	10.40	8	Italy	11.90	8	Australia	12.85
9	England and Wales	10.34	9	Australia	11.45	9	Belgium	12.42
10	Norway	10.33	10	Norway	11.38	10	New Zealand	12.32
11	Italy	10.12	11	England and Wales	11.15	11	Netherlands	12.27
12	Australia	10.00	12	Canada	10.94	12	England and Wales	12.09
13	Belgium	9.40	13	Belgium	10.82	13	Norway	11.87
13	Japan	9.40	14	Japan	10.61	14	Canada	11.49
13	Netherlands	9.40	15	Netherlands	10.50	15	Japan	11.04
16	France	8.39	16	France	10.17	16	France	10.85
17	Sweden	7.02	17	Sweden	8.02	17	Sweden	9.53
18	Finland	4.98	18	Finland	5.61	18	Finland	6.41

SOURCE: R. D. Fraser, *The Supply of Health Services: An International Comparison*, Queen's University (unpublished).

TABLE A209

Rate of Change in Percentage of the Number of Physicians per 10,000 Persons,
an International Comparison, 1950-1955, 1955-1960, 1950-1960

1950-1955			1955-1960			1950-1960		
Rank	Country	Percentage change	Rank	Country	Percentage change	Rank	Country	Percentage change
1	France	19.18	1	Sweden	18.83	1	Italy	37.39
2	Italy	17.65	2	Netherlands	16.86	2	Sweden	35.75
3	Belgium	15.11	3	Italy	16.79	3	Belgium	32.13
4	New Zealand	15.06	4	Belgium	14.79	4	Netherlands	30.50
5	Australia	14.50	5	Finland	14.26	5	France	29.36
6	Sweden	14.25	6	Denmark	13.89	6	Finland	28.71
7	Austria	13.62	7	Australia	12.23	7	Australia	28.50
8	Japan	12.87	8	Israel	10.04	8	Denmark	25.48
9	Finland	12.65	9	France	8.54	9	Japan	17.45
10	Netherlands	11.70	10	England and Wales	8.45	10	New Zealand	17.27
11	Denmark	10.17	11	Canada	5.03	11	England and Wales	16.83
12	Norway	10.16	12	Norway	4.31	12	Austria	15.00
13	England and Wales	7.81	13	Japan	4.05	13	Norway	14.91
14	Switzerland	5.61	14	Switzerland	2.95	14	Canada	10.48
15	Canada	5.19	15	West Germany	2.74	15	Switzerland	8.72
16	West Germany	1.50	16	New Zealand	1.92	16	Israel	8.17
17	U.S.A.	.83	17	Austria	1.10	17	West Germany	4.29
18	Israel	-1.70	18	U.S.A.	-1.03	18	U.S.A.	-67

SOURCE: R. D. Fraser, *The Supply of Health Services: An International Comparison*, Queen's University (unpublished).

TABLE A210
Hospital Beds per 1,000 Persons, an International Comparison, 1950, 1955, 1960

1950 (Average 1949-1951)			1955 (Average 1954-1956)			1960 (Average 1959-1961)		
Rank	Country	Beds per 1,000 persons	Rank	Country	Beds per 1,000 persons	Rank	Country	Beds per 1,000 persons
1	Switzerland	14.55	1	Sweden	14.54	1	Sweden	15.59
2	Sweden	14.15	2	Switzerland	13.60	2	France	13.36
3	New Zealand	13.35	3	France	13.10	3	Switzerland	12.63
4	France	13.00	4	New Zealand	12.47	4	New Zealand	12.41
5	Canada	11.21	5	Canada	11.55	5	Finland	11.64
6	Australia	10.99	6	Australia	11.07	6	Australia	11.44
7	England and Wales	10.71	7	England and Wales	10.84	7	Canada	10.77
8	West Germany	10.66	8	West Germany	10.68	8	Austria	10.57
9	Denmark	10.50	9	Denmark	10.21	9	West Germany	10.54
10	U.S.A.	9.69	10	Austria	10.12	10	England and Wales	10.49
11	Finland	9.41	11	Finland	9.94	11	Denmark	10.44
12	Austria	9.11	12	Norway	9.88	11	Norway	10.44
13	Norway	9.10	13	U.S.A.	9.66	13	Netherlands	9.24
14	Netherlands	8.81	14	Netherlands	9.45	14	U.S.A.	9.15
15	Belgium	7.49	15	Belgium	7.88	15	Italy	9.07
16	Italy	6.70	16	Italy	7.86	16	Belgium	8.23
17	Israel	5.68	17	Israel	6.77	17	Japan	7.38
18	Japan	3.48	18	Japan	5.74	18	Israel	7.13

SOURCE: R. D. Fraser, *The Supply of Health Services: An International Comparison*, Queen's University (unpublished).

TABLE A211

Rate of Change in Percentage of the Number of Hospital Beds per 1,000 Persons:
an International Comparison, 1950-1955, 1955-1960, 1950-1960

1950-1955			1955-1960			1950-1960		
Rank	Country	Percentage change	Rank	Country	Percentage change	Rank	Country	Percentage change
1	Japan	64.94	1	Japan	28.57	1	Japan	112.07
2	Israel	19.19	2	Finland	17.11	2	Italy	35.37
3	Italy	17.31	3	Italy	15.39	3	Israel	25.53
4	Austria	11.09	4	Sweden	7.22	4	Finland	23.64
5	Norway	7.69	5	Norway	6.53	5	Austria	16.03
6	Netherlands	7.23	6	Israel	5.32	6	Norway	14.73
7	Finland	5.58	7	Austria	4.45	7	Sweden	10.18
8	Belgium	5.21	8	Belgium	4.44	8	Belgium	9.88
9	Canada	2.94	9	Australia	3.34	9	Netherlands	4.86
10	Sweden	2.76	10	France	1.98	10	Australia	4.09
11	England and Wales	1.21	11	Denmark	1.86	11	France	2.77
12	France	.77	12	New Zealand	-.48	12	Denmark	-.95
13	Australia	.73	13	West Germany	-1.31	13	West Germany	-1.13
14	West Germany	.19	14	Netherlands	-2.21	14	England and Wales	-2.05
15	U.S.A.	-.31	15	England and Wales	-3.23	15	Canada	-3.93
16	Denmark	-2.76	16	U.S.A.	-5.28	16	U.S.A.	-5.57
17	Switzerland	-6.53	17	Canada	-6.75	17	New Zealand	-7.04
18	New Zealand	-6.59	18	Switzerland	-7.13	18	Switzerland	-13.20

SOURCE: R. D. Fraser, *The Supply of Health Services: An International Comparison*, Queen's University (unpublished).

TABLE A212
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1959

Province	All hospitals		General and Allied Special								Tuberculosis No.	Cap.
	No.	Cap.	No.	Cap.	Total No.	Cap.	No.	Cap.	Allied Special No.	Cap.		
Canada	1,488	189,651	1,360	116,859	1,005	96,098	355	20,761	76	60,782	52	12,010
Newfoundland	51	3,380	48	1,195	45	1,903	3	92	1	835	2	550
Prince Edward Island	12	1,328	9	690	8	659	1	31	2	528	1	110
Nova Scotia	69	7,394	56	4,166	51	3,993	5	173	10	2,713	3	515
New Brunswick	48	5,751	42	3,659	36	3,439	6	220	2	1,331	4	761
Quebec	363	56,685	334	34,893	166	24,086	168	10,807	15	18,328	14	3,464
Ontario	343	59,528	307	35,961	220	30,616	87	5,345	23	20,167	13	3,400
Manitoba	98	10,385	89	6,007	86	5,448	3	559	4	3,405	5	973
Saskatchewan	173	10,798	167	6,946	159	6,357	8	589	3	3,190	3	662
Alberta	137	14,787	128	9,684	112	8,917	16	767	7	4,503	2	600
British Columbia	177	18,828	163	12,071	105	9,893	58	2,178	9	5,782	5	975

¹Beds and cribs only; no bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1962, Table 4.

TABLE A213
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1960

Province	All hospitals		General and Allied Special								Mental No.	Tuberculosis No.
	No.	Cap.	No.	Cap.	Total No.	Cap.	No.	Cap.	Allied Special No.	Cap.		
Canada	1,351	188,467	1,214	113,338	1,019	98,562	195	14,776	77	62,742	60	12,387
Newfoundland	43	2,988	40	1,695	38	1,611	2	84	1	835	2	458
Prince Edward Island	11	1,214	9	737	8	707	1	30	1	377	1	100
Nova Scotia	67	7,523	54	4,240	51	4,092	3	148	10	2,773	3	510
New Brunswick	46	5,499	40	3,459	35	3,254	5	205	2	1,331	4	709
Quebec	300	55,292	268	31,870	167	24,840	101	7,030	17	19,922	15	3,500
Ontario	318	61,793	280	38,558	224	33,695	56	4,863	24	19,980	14	3,255
Manitoba	108	10,332	100	6,178	97	5,426	3	752	4	3,425	4	729
Saskatchewan	171	10,735	165	6,894	158	6,365	7	529	3	3,179	3	622
Alberta	136	14,947	127	9,054	115	8,286	12	768	6	4,793	3	1,100
British Columbia	123	17,312	109	10,243	104	9,876	5	367	9	6,127	5	942

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1960, Table 1.

TABLE A214
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1961

Province	All hospitals		General and Allied Special								Tuberculosis No. Cap.	
	No.	Cap.	No.	Cap.	No.	General Cap.	Allied Special No. Cap.	Mental No. Cap.				
Canada	1,375	194,987	1,230	115,880	1,018	99,530	212	16,350	89	67,743	56	11,364
Newfoundland	45	3,148	42	1,765	40	1,682	2	83	1	835	2	548
Prince Edward Island	11	1,178	9	715	8	685	1	30	1	373	1	90
Nova Scotia	65	7,693	53	4,493	50	4,345	3	148	9	2,690	3	510
New Brunswick	47	6,178	41	3,519	36	3,320	5	199	2	1,950	4	709
Quebec	322	56,759	288	32,019	173	24,215	115	7,804	21	21,372	13	3,368
Ontario	322	64,768	278	39,474	222	34,459	56	5,015	31	22,480	13	2,814
Manitoba	110	10,432	102	6,519	98	5,499	4	1,020	5	3,435	3	478
Saskatchewan	169	11,049	162	7,033	156	6,506	6	527	4	3,491	3	525
Alberta	133	15,337	124	9,329	109	8,187	15	1,142	6	4,908	3	1,100
British Columbia	123	17,729	109	10,584	104	10,202	5	382	9	6,209	5	936

¹Beds and cribs only; no bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1959, Table 1.

TABLE A215
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1962

Province	All hospitals		General and Allied Special									
	No.	Cap.	No.	Cap.	Total	No.	Cap.	Allied Special	Mental	Tuberculosis		
Canada	1,385	196,295	1,250	123,061	937	103,607	313	19,454	87	62,993	48	10,241
Newfoundland	46	3,367	43	1,899	32	1,759	11	140	1	920	2	548
Prince Edward Island	12	1,212	9	724	8	696	1	28	2	398	1	90
Nova Scotia	66	8,197	53	4,716	50	4,531	3	185	10	2,995	3	486
New Brunswick	46	5,864	40	3,783	35	3,584	5	199	2	1,450	4	631
Quebec	292	58,664	260	34,353	157	25,495	103	8,858	20	21,167	12	3,144
Ontario	360	63,163	319	42,177	199	35,703	120	6,474	28	18,255 ³	13	2,731
Manitoba	109	10,701	102	6,794	87	5,612	15	1,182	4	3,425	3	482
Saskatchewan	165	10,875	159	7,073	153	6,546	6	527	4	3,529	2	273
Alberta	135	15,672	126	9,922	107	8,604	19	1,318	6	4,658	3	1,092
British Columbia	124	17,936	110	11,009	96	10,541	14	468	10	6,196	4	731

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

³Excludes residential (custodial care) units.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1961, Table 1.

TABLE A216
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1963

Province	All hospitals		General and Allied Special							Tuberculosis No.	Cap.	
	No.	Cap.	Total		General		Allied Special		Mental			
	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.
Canada	1,384	198,878	1,250	128,006	943	106,822	307	21,184	92	62,181	42	8,691
Newfoundland	47	3,641	44	2,267	31	1,987	13	280	1	826	2	548
Prince Edward Island	12	1,205	9	717	8	687	1	30	2	398	1	90
Nova Scotia	65	8,254	52	4,740	49	4,555	3	185	10	3,028	3	486
New Brunswick	46	6,073	40	3,884	36	3,687	4	197	2	1,600	4	589
Quebec	293	56,345	262	35,338	159	25,889	103	9,449	22	18,838	9	2,169
Ontario	356	65,800	312	44,372	199	37,254	113	7,118	31	18,963 ³	13	2,465
Manitoba	108	10,921	101	6,897	88	5,698	13	1,199	4	3,540	3	484
Saskatchewan	163	11,081	157	7,233	152	6,654	5	579	4	3,529	2	319
Alberta	140	16,476	131	10,373	110	8,769	21	1,604	6	4,966	3	1,137
British Columbia	123	18,452	111	11,555	97	11,088	14	467	10	6,493	2	404

¹Beds and cribs only; no bassinets.²Includes Yukon and Northwest Territories.³Excludes residential (custodial care) units.SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1963, Table 4.

TABLE A217

Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1964

Province	All hospitals		General and Allied Special								Tuberculosis No.	Cap.
	Public, Private, Federal No.	Cap.	Total No.	Cap.	No.	General Cap.	Allied Special No.	Cap.	Mental No.	Cap.		
Canada	1,414	203,222	1,269	131,324	942	110,522	327	20,802	106	65,548	45	6,350
Newfoundland	48	3,683	46	2,579	33	2,425	13	154	1	826	1	278
Prince Edward Island	12	1,210	9	722	8	692	1	30	2	398	1	90
Nova Scotia	63	8,202	51	4,857	48	4,672	3	185	10	2,993	2	352
New Brunswick	45	6,142	39	3,997	35	3,800	4	197	2	1,584	4	561
Quebec	308	55,724	266	35,158	163	26,994	103	8,164	28	18,874	14	1,692
Ontario	364	69,812	317	46,050	200	38,691	117	7,359	34	22,143	13	1,619
Manitoba	109	10,703	102	6,771	87	5,712	15	1,059	4	3,472	3	460
Saskatchewan	161	11,295	155	7,454	147	6,866	8	588	4	3,529	2	312
Alberta	150	17,762	141	11,700	111	9,244	30	2,456	7	5,495	2	567
British Columbia	123	18,047	122	11,394	96	10,862	16	532	8	6,234	3	419

¹Beds and cribs only; no bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1966, Table 4, p. 39.

TABLE A218
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1965

Province	All hospitals			General and Allied Special								Tuberculosis No.	Cap.
	Public, No.	Private, Cap.	Federal Cap.	Total No.	Cap.	No.	General Cap.	Allied No.	Special Cap.	Mental No.	Cap.		
Canada	1,433	205,839		1,283	133,999	955	112,098	328	21,901	105	65,928	45	5,912
Newfoundland	49	3,788		47	2,684	33	2,497	14	187	1	826	1	278
Prince Edward Island	12	1,203		9	722	8	692	1	30	2	391	1	90
Nova Scotia	63	8,357		51	5,048	48	4,863	3	185	10	2,965	2	344
New Brunswick	47	6,379		40	3,950	37	3,766	3	184	4	2,023	3	406
Quebec	317	56,326		273	36,397	169	27,464	104	8,933	28	18,142	16	1,787
Ontario	365	70,715		315	46,615	204	39,388	111	7,227	37	22,580	13	1,520
Manitoba	108	10,602		102	6,872	87	5,845	15	1,027	4	3,495	2	235
Saskatchewan	161	11,084		155	7,343	147	6,756	8	587	4	3,429	2	312
Alberta	151	18,253		141	11,839	112	9,309	29	2,530	8	5,847	2	567
British Columbia	129	18,511		119	11,908	96	10,974	23	934	7	6,230	3	373

¹Beds and cribs only; no bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1967, Table 4.

TABLE A219
Operating Hospitals and their Bed Capacities,¹ by Type of Hospital, Canada²
and the Provinces, 1966

Province	All hospitals			General and Allied Special								Tuberculosis No.	Cap.
	Public, No.	Private, Cap.	Federal Cap.	No.	Total Cap.	No.	General Cap.	Allied Special No.	Special Cap.	No.	Mental Cap.		
Canada	1,421	207,309		1,273	136,876	948	114,591	325	22,285	108	65,265	40	5,168
Newfoundland	49	4,193		47	3,089	34	2,927	13	162	1	826	1	278
Prince Edward Island	12	1,188		9	720	8	690	1	30	2	398	1	70
Nova Scotia	60	7,771		50	4,935	47	4,750	3	185	8	2,492	2	344
New Brunswick	47	6,372		40	3,950	37	3,766	3	184	4	2,016	3	406
Quebec	303	57,045		264	37,277	165	28,208	99	9,069	28	18,353	11	1,415
Ontario	362	71,538		309	47,273	199	40,044	110	7,229	40	22,910	13	1,355
Manitoba	107	10,111		99	6,762	84	5,740	15	1,022	6	3,122	2	227
Saskatchewan	160	10,601		154	7,336	146	6,750	8	586	4	2,963	2	302
Alberta	161	19,008		151	12,762	119	10,086	32	2,676	8	5,841	2	405
British Columbia	126	18,870		116	12,160	95	11,104	21	1,056	7	6,344	3	366

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1968, Tables 5 and 6.

TABLE A220
**Percentage Distribution of Reporting Hospitals and their Bed Capacities,¹ by Type
of Hospital, Canada² and the Provinces, 1966**

	All Hospitals Hospitals	Beds	General Hospitals	Beds	Allied Special Hospitals	Beds	Mental Hospitals	Beds	Tuberculosis Hospitals	Beds
Canada	100.0	100.0	66.7	55.3	22.9	10.7	7.6	31.5	2.8	2.5
Newfoundland	100.0	100.0	69.5	69.8	26.5	3.9	2.0	19.7	2.0	6.6
Prince Edward Island	100.0	100.0	66.7	58.1	8.3	2.5	16.7	33.5	8.3	5.9
Nova Scotia	100.0	100.0	78.3	61.1	5.1	2.4	13.3	32.1	3.3	4.4
New Brunswick	100.0	100.0	78.7	59.1	6.4	2.9	8.5	31.6	6.4	6.4
Quebec	100.0	100.0	54.5	49.4	32.7	15.9	9.2	32.2	3.6	2.5
Ontario	100.0	100.0	55.0	56.0	30.4	10.1	11.0	32.0	3.6	1.9
Manitoba	100.0	100.0	78.5	56.8	14.0	10.1	5.6	30.9	1.9	2.2
Saskatchewan	100.0	100.0	91.2	63.7	5.0	5.5	2.5	28.0	1.3	2.8
Alberta	100.0	100.0	73.9	53.1	19.9	14.1	5.0	30.7	1.2	2.1
British Columbia	100.0	100.0	58.8	58.8	16.7	5.6	5.6	33.6	2.3	2.0

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1959, Tables 5 and 6.

TABLE A221

**Size and Rated Bed Capacity of Operating Public General and Allied
Special Hospitals, 1966**

Province, type of hospital and size	Hospitals operating	Rated bed capacity	
		Beds and cribs	Bassinets
<i>Canada</i>	1,027	122,315	17,577
General	869	105,501	11,044
1-9 beds	33	256	133
10-24 beds	204	3,368	1,054
25-49 beds	197	6,700	1,527
50-99 beds	149	10,235	2,199
100-199 beds	128	17,546	3,288
200-299 beds	63	15,269	2,644
300-499 beds	56	20,979	3,099
500-999 beds	30	19,854	2,065
1000 beds or more	9	11,294	1,005
Chronic, Convalescent, Rehabilitation	104	14,731	—
Maternity	8	704	511
Other	54	2,083	533
<i>Newfoundland</i>	47	3,089	415
General	34	2,927	382
10-24 beds	12	191	62
25-49 beds	10	333	64
50-99 beds	4	239	33
100-199 beds	3	456	67
200-299 beds	2	498	64
300-499 beds	3	1,210	92
500-999 beds	—	—	—
Chronic, Convalescent, Rehabilitation	2	72	—
Other	11	90	33
<i>Prince Edward Island</i>	9	720	132
General	8	690	132
10-24 beds	2	34	13
25-49 beds	2	60	12
50-99 beds	1	56	11
100-199 beds	2	313	60
200-299 beds	1	227	36
Chronic, Convalescent, Rehabilitation	1	30	—

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1968, Table 16.

TABLE A221 (Continued)
**Size and Rated Bed Capacity of Operating Public General and Allied
Special Hospitals, 1966**

Province, type of hospital and size	Hospitals operating	Rated bed capacity	
		Beds and cribs	Bassinets
<i>Nova Scotia</i>	47	4,366	919
General	44	4,181	765
1-9 beds	5	43	29
10-24 beds	9	140	53
25-49 beds	6	214	38
50-99 beds	10	726	176
100-199 beds	8	1,216	204
200-299 beds	4	838	146
300-499 beds	1	482	119
500-999 beds	1	522	—
Chronic, Convalescent, Rehabilitation	2	74	—
Others	1	111	154
<i>New Brunswick</i>	39	3,645	733
General	36	3,461	733
1-9 beds	1	9	5
10-24 beds	7	103	43
25-49 beds	9	341	90
50-99 beds	6	417	116
100-199 beds	7	841	170
200-299 beds	4	838	156
300-499 beds	1	368	71
500-999 beds	1	544	82
Chronic, Convalescent, Rehabilitation	2	105	—
Other	1	79	—
<i>Quebec</i>	170	31,913	3,777
General	132	26,239	3,677
1-9 beds	1	7	5
10-24 beds	8	161	61
25-49 beds	17	587	111
50-99 beds	17	1,188	314
100-199 beds	44	5,912	1,058
200-299 beds	19	4,811	806
300-499 beds	15	5,674	746
500-999 beds	9	5,847	395
1000 beds or more	2	2,052	181
Chronic, Convalescent, Rehabilitation	28	4,553	—
Other	10	1,121	100

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1968, Table 16.

TABLE A221 (Continued)

Size and Rated Bed Capacity of Operating Public General and Allied Special Hospitals, 1966

Province, type of hospital and size	Hospitals operating	Rated bed capacity	
		Beds and cribs	Bassinets
<i>Ontario</i>	221	42,857	6,066
General	181	37,513	5,935
10-24 beds	9	168	63
25-49 beds	28	1,043	276
50-99 beds	46	3,138	676
100-199 beds	34	4,623	955
200-299 beds	23	5,712	1,078
300-499 beds	25	9,112	1,430
500-999 beds	12	8,302	1,043
1000 beds or more	4	5,415	414
Chronic, Convalescent, Rehabilitation	24	4,875	—
Maternity	1	77	61
Other	16	469	131
<i>Manitoba</i>	82	5,947	928
General	78	4,887	926
1-9 beds	6	56	31
10-24 beds	38	576	201
25-49 beds	16	535	132
50-99 beds	9	588	125
100-199 beds	3	385	53
200-299 beds	3	660	96
300-499 beds	1	418	65
500-999 beds	1	1,669	223
1000 beds or more	1	1,012	156
Chronic, Convalescent, Rehabilitation	4	935	—
<i>Saskatchewan</i>	181	7,222	1,283
General	144	6,640	1,275
1-9 beds	16	120	55
10-24 beds	77	1,186	376
25-49 beds	29	965	252
50-99 beds	9	689	134
100-199 beds	6	912	143
200-299 beds	2	524	70
300-499 beds	3	1,063	146
500-999 beds	2	1,181	99
Chronic, Convalescent, Rehabilitation	3	570	—
Other	4	12	8

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1968, Table 16.

TABLE A221 (Concluded)

**Size and Rated Bed Capacity of Operating Public General and Allied
Special Hospitals, 1966**

Province, type of hospital and size	Hospitals operating	Rated bed capacity	
		Beds and cribs	Bassinet
<i>Alberta</i>	142	11,784	1,674
General	114	9,122	1,640
1-9 beds	3	24	13
10-24 beds	24	415	124
25-49 beds	45	1,445	329
50-99 beds	28	1,813	345
100-199 beds	5	704	133
200-299 beds	2	437	55
300-499 beds	4	1,444	259
500-999 beds	2	1,745	265
1000 beds or more	1	1,095	117
Chronic, Convalescent, Rehabilitation	27	2,609	—
Maternity	1	44	34
Other	1	53	34
<i>British Columbia</i>	109	10,502	1,605
General	88	9,446	1,532
1-9 beds	1	9	2
10-24 beds	14	279	65
25-49 beds	29	967	200
50-99 beds	19	1,300	255
100-199 beds	16	2,184	444
200-299 beds	3	724	137
300-499 beds	3	1,208	171
500-999 beds	2	1,055	121
1000 beds or more	1	1,720	137
Chronic, Convalescent, Rehabilitation	11	908	—
Maternity	1	93	86
Other	10	148	73
<i>Yukon</i>	2	26	8
General	2	26	8
10-24 beds	2	26	8
<i>Northwest Territories</i>	8	244	37
General	8	244	37
10-24 beds	2	37	11
25-49 beds	6	207	26
50-99 beds	—	—	—

SOURCE: DBS, *Hospital Statistics*, Vol. I, Queen's Printer, Ottawa, 1968, Table 16.

TABLE A222

Major Equipment (Undepreciated Value) per Rated Bed, Reporting Public General and Allied Special Hospitals, Canada¹ and the Provinces, 1961, 1964, 1966

Province	1961	(Dollars) 1964	1966
Canada	2,574.25	3,207.49	3,792.43
Newfoundland	1,929.68	2,736.19	4,392.40
Prince Edward Island	2,003.02	2,400.87	2,650.60
Nova Scotia	2,598.51	3,029.44	3,595.48
New Brunswick	3,179.74	3,726.88	4,317.73
Quebec	2,809.44	3,568.52	4,517.52
Ontario	2,676.54	3,404.34	3,904.51
Manitoba	2,394.99	2,801.32	3,208.42
Saskatchewan	2,589.91	2,971.97	3,506.69
Alberta	2,026.95	2,539.33	2,711.19
British Columbia	2,196.89	2,668.44	3,104.16

¹Includes Northwest Territories.

SOURCE: DBS, *Hospital Statistics*, Vol. III, Queen's Printer, Ottawa, 1961, Table 77; 1964, Table 33; 1966, Table 29.

TABLE A223

Gross Fixed Capital Formation in Hospital Construction and Hospital Machinery as Percentages of Total Private and Public Investment and of Government Gross Fixed Capital Formation, in Current Millions of Dollars, in Canada, 1946-1968

	Hospital con- struction gross fixed capital formation	Hospital con- struction as a % of total GFCF	Hospital con- struction as a % of gov't. expenditure on GFCF	Hospital machinery gross fixed capital formation	Hospital machinery as a % of total GFCF	Hospital machinery as a % of gov't. expenditure in GFCF	Total hospital gross fixed capital formation	Total hospital GFCF as a % of total GFCF	Total hospital GFCF as a % of gov't. expenditure on GFCF	Total private & public investment in Canada	Business GFCF	Gov't. GFCF
1946	23.8	1.42	8.32	4.5	0.27	1.57	28.3	1.69	9.89	1,674	1,388	286
1947	27.0	1.10	7.60	6.1	0.25	1.72	33.1	1.35	9.32	2,440	2,085	355
1948	44.0	1.42	9.40	11.6	0.37	2.48	55.6	1.80	11.88	3,087	2,619	468
1949	61.3	1.73	12.09	10.1	0.28	1.99	71.4	2.01	14.08	3,539	3,032	507
1950	62.3	1.58	10.59	10.7	0.27	1.82	73.0	1.85	12.41	3,936	3,348	588
1951	65.5	1.38	8.40	13.5	0.28	1.73	79.0	1.67	10.13	4,739	3,959	780
1952	81.4	1.48	7.82	11.9	0.22	1.14	93.3	1.70	8.97	5,491	4,451	1,040
1953	103.1	1.72	10.54	15.2	0.25	1.55	118.3	1.98	12.09	5,976	4,998	978
1954	106.4	1.85	11.29	15.2	0.26	1.61	121.6	2.12	12.90	5,721	4,779	942
1955	130.0	2.08	12.57	16.2	0.26	1.57	146.2	2.34	14.14	6,244	5,210	1,034
1956	110.0	1.37	8.72	18.7	0.23	1.48	128.7	1.60	10.21	8,034	6,774	1,260
1957	111.7	1.27	8.08	19.1	0.22	1.38	130.8	1.49	9.46	8,717	7,335	1,382
1958	136.1	1.62	9.79	25.4	0.30	1.83	161.5	1.92	11.61	8,364	6,975	1,389
1959	128.2	1.51	8.41	23.7	0.28	1.55	151.9	1.79	9.96	8,417	6,894	1,523
1960	125.3	1.52	7.97	30.7	0.37	1.95	156.0	1.89	9.92	8,262	6,692	1,570
1961	146.6	1.79	9.53	31.2	0.38	2.03	177.8	2.17	11.56	8,172	6,635	1,537
1962	165.0	1.88	9.39	33.1	0.38	1.88	198.1	2.26	11.27	8,715	6,960	1,755
1963	148.9	1.58	8.25	39.8	0.42	2.20	188.7	2.00	10.45	9,393	7,591	1,802
1964	144.9	1.32	7.87	38.3	0.35	2.08	183.2	1.67	9.95	10,944	9,103	1,841
1965	152.5	1.19	6.89	40.9	0.32	1.85	193.4	1.50	8.74	12,865	10,651	2,214
1966	180.1	1.19	6.93	48.9	0.32	1.88	229.0	1.52	8.82	15,090	12,493	2,597
1967	179.5	1.17	6.39	60.0	0.39	2.13	239.5	1.56	8.53	15,322	12,365	2,809
1968	197.7	1.26	6.76	60.0	0.38	2.05	257.7	1.64	8.81	15,678	12,753	2,925

SOURCE: Hospital data are taken from DBS, *Public and Private Investment in Canada: Outlook 1969*, Queen's Printer, Ottawa, 1969. The remaining data are taken from DBS, *National Accounts*, Queen's Printer, Ottawa, 1926-1956, Table 54; 1962, Table 2; 1965, Table 1; 1967, Table 2.

The business gross fixed capital formation includes private and government business enterprises, private non-commercial institutions, and outlays on new residential construction by individuals and business investors. The government gross fixed capital formation includes new durable assets of the government other than government business enterprises. It includes defence plant and equipment. These two figures together make up "Total Private and Public Investment in Canada".

It was found impossible to find or develop reliable investment figures for the other health services such as offices of physicians, offices of dentists and other health services (Industries Nos. 823, 825 and 827 of the Capital Stock Section, DBS).

No consideration has been taken here of residual errors of estimates in the tables in the National Accounts Income and Expenditure.

Appendix II

Distribution of Health Care Resources

TABLE A224
Numbers and Percentages Employed in Various Health Services in Ontario,
by Size of Community, 1951

	Dentists	Dietitians	Lab. techs.	Grad. nurses	Nurses in training	Osteo. and chiro.	Phys. and surg.	Social welfare workers	Attendants doctors' offices	Dental mechanics	Opticians	Personal practical nurses	Population
All Ontario	1,966	515	6,502	13,693	5,042	427	5,363	1,798	1,102	523	631	8,747	4,597,542
Areas over 100,000 pop.	630	271	2,490	5,031	2,310	160	1,932	940	412	245	267	3,056	1,206,169
% of total	32.00	52.60	38.10	36.74	45.74	37.46	35.94	52.26	37.37	46.84	42.29	34.84	26.2
Population 30,000-100,000	264	67	1,117	2,337	1,343	68	838	220	176	68	81	1,592	503,864
% of total	13.41	13.00	17.09	17.07	26.60	15.92	15.59	12.23	15.96	13.00	12.83	18.15	10.9
Population 10,000-30,000	266	42	654	1,829	720	62	642	179	123	52	76	981	396,675
% of total	13.51	8.15	10.00	13.36	14.26	14.51	11.94	9.95	11.16	9.94	12.04	11.18	8.6
Population under 10,000	806	135	2,241	4,496	669	137	1,951	450	391	158	207	3,118	2,490,834
% of total	41.08	26.25	34.81	32.83	13.40	32.11	36.53	25.56	35.51	30.22	32.84	35.83	54.30

SOURCE: DBS, *Census of Canada*, Series 3.1, Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

TABLE A225
Numbers and Percentages Employed in Various Health Services in Ontario,
by Size of Community, 1961
(Including Metropolitan Areas)

	Health and welfare owners or mgrs.	Total health pros.	Phys. and surgs.	Dentists	Pharm.	Grad. nurses	Nurses in training	Med. and dent. techs.	Phys. and occup therapi
All Ontario	1,630	52,621	8,040	2,299	2,981	24,579	7,588	4,887	1,128
Metropolitan areas	863	32,361	5,394	1,482	1,966	14,035	4,659	3,356	787
% of total	52.90	61.50	66.89	64.32	65.86	57.10	61.03	68.46	69.73
Population 30,000-100,000	213	8,168	1,007	292	362	3,579	1,743	670	145
% of total	13.06	15.52	12.49	12.67	12.13	14.56	22.83	13.67	12.85
Population 10,000-30,000	—	6,628	991	311	347	3,017	969	387	—
% of total	—	12.60	12.29	13.50	11.62	12.27	12.69	7.89	—
Population under 10,000	—	5,464	648	214	306	3,948	217	474	—
% of total	—	10.38	14.14	9.51	10.39	16.07	3.45	9.98	—

¹Optometrists, osteopaths, chiropractors and "others".

²Optometrists, osteopaths, chiropractors, therapists, "others", dietitians, social workers, opticians.

³Probably includes attendants in doctors' and dentists' offices.

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

TABLE A226
Numbers and Percentages Employed in Various Health Services in Ontario,
by Size of Community, 1961
(No Metropolitan Areas)

	Health and welfare owners or mgrs.	Total health pros.	Phys. and surgs.	Dentists	Pharm.	Grad. nurses	Nurses in training	Med. and dent. techs.	Phys. and occu ther pist
All Ontario	1,630	52,621	8,040	2,299	2,981	24,579	7,588	4,887	1,128
Population over 100,000	424	18,376	2,787	571	788	8,102	3,518	2,749	451
% of total	25.99	34.92	34.56	24.78	26.40	32.96	46.09	56.08	40.4
Population 30,000—100,000	247	9,797	1,220	345	412	4,276	2,186	783	171
% of total	15.14	18.62	15.13	14.97	13.80	17.40	28.64	15.97	15.2
Population 10,000—30,000	—	628	991	311	347	3,017	969	387	—
% of total	—	12.60	12.29	13.50	11.62	12.27	12.69	7.89	—
Population under 10,000	—	23,820	3,042	1,072	1,434	9,184	915	968	—
% of total	—	33.86	38.02	46.75	48.18	37.37	12.58	20.06	—

¹Optometrists, osteopaths, chiropractors and "others".

²Optometrists, osteopaths, chiropractors, therapists, "others", dietitians, social workers, opticians.

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

Optom.	Osteo. and chiro.	Other health pros.	1	2	Nursing aides and assistants	Dietitians	Social welfare workers	Attendants— doctors' and dentists' offices	Opticians	Population
414	495	210	1,119	8,013	24,049	829	4,173	1,803	764	6,236,092
235	269	160	664	5,611	11,858	574	3,086	1,227	500	3,253,626
56.76	54.34	76.19	59.34	69.58	49.31	69.24	73.76	67.98	65.44	52.1
—	—	—	146	933	3,816	102	448	215	92	684,572
—	—	—	13.05	11.64	15.87	12.30	10.74	11.92	12.04	10.9
—	—	—	—	676	3,198	—	—	—	—	596,432
—	—	—	—	8.44	13.30	—	—	—	—	9.5
—	—	—	—	793	5,177 ⁸	—	—	—	—	1,701,462
—	—	—	—	10.34	21.52	—	—	—	—	27.50

Optom.	Osteo. and chiro.	Other health pros.	1	2	Nursing aides and assistants	Dietitians	Social welfare workers	Attendants— doctors' and dentists' offices	Opticians	Population
414	495	210	1,119	8,013	24,049	829	4,173	1,803	764	6,236,092
81	122	81	284	3,126	7,737	352	1,737	652	296	1,498,540
19.56	24.65	38.57	25.38	39.01	32.17	42.46	41.51	36.12	38.74	24.0
—	—	—	179	1,128	4,369	126	548	270	103	839,177
—	—	—	16.00	14.08	18.17	15.20	13.10	14.96	13.48	13.4
—	—	—	—	676	3,198	—	—	—	—	596,432
—	—	—	—	8.44	13.30	—	—	—	—	9.5
—	—	—	—	3,083	8,745	—	—	—	—	3,301,943
—	—	—	—	38.47	36.56	—	—	—	—	53.10

TABLE A227
Numbers and Percentages Employed in Various Health Services in Ontario,
by Size of Community, 1966
(Including Metropolitan Areas)

	Dentists	Dental Hygienists	Optometrists	Podiatrists	Physiotherapists	Hospitals or clinics with physiotherapy facilities	Psychologists	Dental specialists	Reg. masseurs	Reg. chiropractors	Population
All Ontario	2,721	218	612	75	964	249	325	165	383	528	6,960,870
Metropolitan Areas	1,654	152	249	51	604	125	258	146	278	241	3,553,785
% of total	60.70	69.72	40.59	67.98	62.21	50.13	79.21	88.48	72.56	45.62	51.0
Population 30,000—100,000	415	29	89	18	164	58	31	15	34	88	1,023,604
% of total	15.23	13.30	14.51	23.99	16.89	23.26	9.52	9.09	8.87	16.66	14.7
Population 10,000—30,000	226	10	68	2	45	21	22	2	7	65	458,049
% of total	8.29	4.59	11.08	2.67	4.64	8.42	6.75	1.21	1.83	12.30	6.5
Population under 10,000	426	27	205	4	151	43	14	2	64	134	1,925,432
% of total	15.78	12.39	33.82	5.36	16.26	18.19	4.52	1.21	16.70	25.37	27.8

SOURCE: Information on the geographic distribution of the various health care resources for 1966 has been taken from a variety of sources. Among these are the Canadian Dental Association, the Official Register of Masseurs, the Official Register of Physiotherapists, the list of registrants under the Chiroprody Act, the Ontario Psychological Association Directory, the Official Register of Chiropractors, the Canadian Association of Occupational Therapists, the Canadian Association of Optometrists.

TABLE A228
Numbers Employed in Various Health Professions in Cities with Population
over 100,000, Ontario, 1951

	Dentists	Dietitians	Lab. techs.	Grad. nurses	Nurses in training	Osteo. and chiro.	Phys. and surg.	Social welfare workers	Attendants—			Personal practical nurses	Population
									doctors' offices	Dental mechanics	Opticians		
All Ontario	1,966	515	6,502	13,693	5,042	427	5,363	1,798	1,102	523	631	8,747	4,597,540
Hamilton	90	28	274	727	423	18	265	118	56	26	26	484	208,320
% of total	4.57	5.43	4.19	5.31	8.38	4.21	4.93	6.56	5.08	4.97	4.12	5.52	4.5
Ottawa	97	32	781	935	402	16	406	142	57	37	21	438	202,040
% of total	4.93	6.21	11.95	6.83	7.96	3.75	7.55	7.90	5.17	7.07	3.33	4.99	4.3
Toronto	408	202	1,303	2,961	1,179	115	1,096	641	258	163	209	1,943	675,750
% of total	20.73	39.21	19.94	21.62	23.34	26.92	20.39	35.64	23.40	31.17	33.11	22.15	14.6
Windsor	35	9	132	408	306	11	165	39	41	19	11	191	120,040
% of total	1.78	1.75	2.02	2.98	6.06	2.58	3.07	2.17	3.72	3.63	1.74	2.18	2.6
Total	630	271	2,490	5,031	2,310	160	1,932	940	412	245	267	3,056	1,206,160
% of all Ont.	32.00	52.60	38.10	36.74	45.74	37.46	35.94	52.26	37.37	46.84	42.29	34.84	26.2

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force—Occupations by Sex, Queen's Printer, Ottawa, 1951.

TABLE A229
Numbers Employed in Various Health Professions in Communities with
Population 30,000 to 100,000, Ontario, 1951

					Attendants—							
	Dentists	Dietitians	Lab. techs.	Grad. nurses	Nurses in training	Osteo. chiro.	Phys. and surg.	Social welfare workers	doctors' offices	Dental mechanics	Opticians	Personal practical nurses
Brantford	17	2	41	170	63	9	42	22	9	4	4	110
% of total	0.86	0.39	0.63	1.24	1.25	2.11	0.78	1.22	0.82	0.76	0.63	1.25
Fort William	12	4	51	121	62	1	42	5	6	5	5	134
% of total	0.61	0.78	0.78	0.88	1.23	0.23	0.78	0.28	0.54	0.96	0.79	1.53
Kingston	25	12	156	319	268	2	135	26	19	10	6	215
% of total	1.27	2.33	2.39	2.33	5.31	0.47	2.51	1.45	1.72	1.91	0.95	2.45
Oshawa	16	3	41	114	66	4	40	18	6	4	1	85
% of total	0.81	0.58	0.63	0.83	1.31	0.94	0.74	1.00	0.54	0.76	0.16	0.97
Peterborough	25	7	63	178	153	6	57	33	7	4	9	78
% of total	1.27	1.36	0.96	1.30	3.03	1.40	1.06	1.83	0.63	0.76	1.43	0.89
Port Arthur	14	3	44	105	86	3	38	12	9	3	4	99
% of total	0.71	0.58	0.67	0.77	1.70	0.70	0.71	0.67	0.82	0.57	0.63	1.13
St. Catharines	29	3	42	141	48	6	58	15	23	4	8	45
% of total	1.47	0.50	0.64	1.03	0.95	1.40	1.08	0.83	2.09	0.76	1.26	0.51
Sault Ste. Marie	13	0	77	108	42	5	27	6	8	4	2	53
% of total	0.66	0.00	1.18	0.79	0.83	1.17	0.50	0.33	0.73	0.76	0.32	0.60
Sarnia	16	3	310	145	52	5	42	8	17	3	2	51
% of total	0.81	0.58	4.74	1.06	1.03	1.17	0.78	0.44	1.54	0.57	0.32	0.58
London	49	22	186	596	391	13	241	49	45	18	23	583
% of total	2.49	4.27	2.85	4.35	7.74	3.04	4.48	2.72	4.08	3.44	3.64	6.65
Kitchener	24	8	59	198	90	10	63	11	16	4	12	73
% of total	1.22	1.55	0.91	1.45	1.78	2.34	1.17	0.61	1.45	0.76	1.90	0.83
Sudbury	24	4	47	142	22	4	53	15	11	5	5	66
% of total	1.22	0.78	0.72	1.04	0.44	0.94	0.99	0.83	1.00	0.96	0.79	0.75
Total	264	67	1,117	2,337	1,343	68	838	220	176	68	81	1,592
% of Ontario total	13.41	13.00	17.09	17.07	26.60	15.92	15.59	12.23	15.96	13.00	12.83	18.15
												10.9

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force—Occupations by Sex, Queen's Printer, Ottawa, 1951.

TABLE A230
Numbers Employed in Various Health Professions in Communities with
Population 10,000 to 30,000, Ontario, 1951

	Dentists	Dietitians	Lab. techs.	Grad. nurses	Nurses in training	Osteo. and chiro.	Phys. and surg.	Attendants—				Personal practical nurses	Population
								Social welfare workers	doctors' offices	Dental mechanics	Opticians		
Barrie	9	1	4	43	39	3	18	2	8	2	—	8	12,514
Belleville	13	2	51	131	38	2	26	15	5	4	37	52	19,519
Brockville	8	2	16	125	63	1	19	9	2	2	—	61	12,301
Chatham	14	3	2	127	80	2	36	7	7	3	8	33	21,218
Cornwall	9	2	94	87	72	2	24	9	—	—	3	37	16,899
Eastview	3	—	44	11	2	—	9	5	4	2	3	7	13,799
Forest Hill	53	4	21	50	6	—	120	13	11	2	1	29	15,305
Galt	7	4	23	55	11	6	16	7	3	1	—	34	19,207
Guelph	17	7	70	126	58	4	37	17	7	2	2	77	27,386
Leaside	25	2	23	46	4	4	63	13	5	5	5	17	16,233
Mimico	1	—	25	44	1	1	11	4	2	1	—	21	11,342
New Toronto	3	—	16	44	24	2	8	4	4	—	2	47	11,194
Niagara Falls	9	2	62	105	38	9	29	8	4	4	—	36	22,874
North Bay	11	1	18	87	47	3	26	7	6	1	3	17	17,944
Orillia	8	2	8	56	30	5	19	6	8	2	3	91	12,110
Owen Sound	13	1	8	76	29	2	17	3	5	3	5	39	16,423
Pembroke	7	—	39	89	37	1	13	4	3	2	—	25	12,704
St. Thomas	11	2	11	129	28	3	26	10	9	1	1	140	18,173
Stratford	9	3	13	83	50	5	21	3	5	3	1	32	18,785
Timmins	9	—	14	53	39	1	32	10	6	3	—	16	27,743
Trenton	4	1	4	38	—	2	11	2	2	3	—	11	10,085
Waterloo	7	—	14	33	—	—	13	6	1	1	2	12	11,991
Welland	6	1	35	94	1	2	23	9	9	1	—	24	15,382
Woodstock	10	2	19	97	23	2	25	6	7	4	—	115	15,544
Total	266	42	654	1,829	720	62	642	179	123	52	76	981	396,675
% of total	13.51	8.15	10.00	13.36	14.26	14.51	11.94	9.95	11.16	9.94	12.04	11.18	8.6

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force—Occupations by Sex, Queen's Printer, Ottawa, 1951.

TABLE A231
Numbers Employed in Various Health Services for the Census Metropolitan Areas, Ontario, 1961

	Health and welfare owners or mgrs.	Total health pros.	Phys. and surgs.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Optom.
Ontario Total	1,630	52,621	8,040	2,299	24,579	7,588	1,128	414
Hamilton	81	3,574	520	156	1,640	610	82	25
% of total in Ontario	4.97	6.79	6.45	6.77	6.65	7.99	7.27	6.04
London	47	2,851	433	73	1,258	587	69	18
% of total	2.88	5.42	5.37	3.17	5.12	7.69	6.11	4.35
Ottawa	133	4,019	690	156	1,774	707	69	25
% of total	8.15	7.64	8.56	6.77	7.22	9.26	6.11	6.04
Toronto	509	17,608	3,157	941	7,471	1,810	500	135
% of total	31.20	33.46	39.15	40.84	30.40	23.71	44.30	32.60
Windsor	42	2,019	280	69	870	399	33	12
% of total	2.57	3.84	3.47	2.99	3.54	5.23	2.92	2.89
Kitchener	26	1,266	185	58	557	289	17	13
% of total	1.59	2.41	2.29	2.52	2.27	3.79	1.51	3.14
Sudbury	25	1,024	129	29	465	257	17	7
% of total	1.53	1.95	1.60	1.26	1.89	3.37	1.51	1.79
Total	863	32,361	5,394	1,482	14,035	4,659	787	235
% of Ontario	52.90	61.50	66.89	64.32	57.70	61.03	69.73	56.76

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

TABLE A232
Numbers Employed in Various Health Services for Cities Within the Metropolitan Areas, Ontario, 1961

	Health and welfare owners or mgrs.	Total health pros.	Phys. and surgs.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Optom.
Hamilton	56	2,702	359	100	1,219	560	62	9
	3.43	5.13	4.45	4.34	4.96	7.34	5.49	2.17
London	46	2,770	424	68	1,211	586	67	17
	2.82	5.26	5.26	2.95	4.93	7.68	5.94	4.11
Ottawa	100	3,223	555	119	1,428	611	63	16
	6.13	6.12	6.88	5.16	5.81	8.00	5.58	3.86
Toronto	196	8,306	1,271	247	3,674	1,396	244	34
	12.01	5.78	15.76	10.72	14.95	18.29	21.62	8.21
Windsor	26	1,375	178	37	570	365	21	5
	1.59	2.61	2.21	1.61	2.32	4.78	1.86	1.21
Kitchener	10	717	101	26	296	201	10	7
	0.61	1.36	1.25	1.13	1.20	2.63	0.89	1.69
Sudbury	24	912	112	27	401	242	17	7
	1.47	1.73	1.39	1.17	1.63	3.17	1.51	1.69

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

Osteo. and chiro.	Pharm.	Med. and dent. techs.	Other health pros.	Dieti- tians	Social welfare workers	Attendants— doctors' and dentists' offices	Home nursing assistants and aides	Opticians	Population
495	2,981	4,887	210	829	4,173	1,803	24,049	764	6,236,092
31	214	284	12	45	266	155	1,685	38	359,189
6.26	7.17	5.79	5.71	5.43	6.36	8.59	7.01	4.93	5.7
27	115	261	10	53	158	79	1,511	34	181,283
5.45	3.85	5.32	4.76	6.39	3.78	4.38	6.28	4.45	2.9
14	171	396	17	74	412	116	1,631	43	429,750
2.83	5.73	8.08	8.09	8.92	9.85	6.43	6.78	5.63	6.8
167	1,274	2,046	107	337	1,986	730	5,439	344	1,824,481
33.74	42.67	41.73	50.95	40.65	47.46	40.44	22.62	45.03	29.2
7	115	211	5	25	119	75	761	24	193,365
1.41	3.85	4.30	2.38	3.02	2.84	4.15	3.16	3.14	3.1
19	44	78	6	23	88	52	454	13	154,864
3.84	1.47	1.59	2.85	2.77	2.10	2.88	1.89	1.70	2.4
4	33	80	3	17	57	20	377	4	110,694
0.81	1.11	1.63	1.43	2.05	1.36	1.11	1.57	0.52	2.0
269	1,966	3,356	160	574	3,086	1,227	11,858	500	3,253,626
54.34	65.86	68.46	76.19	69.24	73.76	67.98	49.31	65.44	52.1

Osteo. and chiro.	Pharm.	Med. and dent. techs.	Other health pros.	Dieti- tians	Social welfare workers	Attendants— doctors' and dentists' offices	Home nursing assistants and aides	Opticians	Population
16	147	221	9	37	202	102	1,491	35	273,991
3.23	4.92	4.51	4.29	4.46	4.83	5.65	6.20	4.58	4.3
27	107	253	10	52	157	77	1,481	34	169,569
5.45	3.58	5.16	4.76	6.27	3.75	4.27	6.16	4.45	2.7
10	131	1,136	16	65	357	96	1,094	34	268,206
2.02	4.39	23.17	7.62	7.84	8.53	5.32	4.55	4.45	4.3
63	329	1,005	43	181	942	325	3,104	178	672,407
12.73	11.02	20.50	20.48	21.83	22.51	18.01	12.91	23.30	10.7
6	74	134	3	17	79	52	567	13	114,367
1.21	2.48	2.73	1.43	2.05	1.89	2.88	2.36	1.70	1.8
9	21	43	3	10	47	39	236	8	74,485
1.82	0.70	0.88	1.43	1.21	1.12	2.16	0.98	1.05	1.1
4	29	70	3	14	53	16	317	3	80,120
0.81	0.97	1.43	1.43	1.69	1.27	0.89	1.32	0.39	1.2

TABLE A233

**Numbers Employed in Various Health Services for Cities and Towns of Population
30,000 to 100,000, Ontario, 1961**

	Health and welfare owners or mgrs.	Total health pros.	Phys. and surgs.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists
Belleville	6	399	37	12	179	119	5
% of total	0.37	0.76	0.46	0.52	0.73	1.56	0.44
Brantford	19	657	69	18	313	155	12
% of total	1.16	1.25	0.86	0.78	1.27	2.03	1.06
Burlington	14	414	76	30	196	22	9
% of total	0.86	0.79	0.94	1.30	0.80	0.29	0.80
Cornwall	25	409	43	10	184	117	2
% of total	1.53	0.78	0.53	0.43	0.75	1.53	0.18
Fort William	13	505	49	14	270	79	7
% of total	0.80	0.98	0.61	0.61	1.10	1.03	0.62
Guelph	10	608	57	17	281	161	13
% of total	0.61	1.16	0.71	0.74	1.14	2.11	1.15
Kingston	31	1,282	205	26	520	324	43
% of total	1.90	2.44	2.54	1.13	2.12	4.24	3.81
Oshawa	7	575	70	23	297	95	9
% of total	0.43	1.09	0.87	1.00	1.21	1.24	0.80
Peterborough	19	619	65	29	287	152	4
% of total	1.16	1.18	0.81	1.26	1.17	2.00	0.35
Port Arthur	17	538	59	21	234	131	18
% of total	1.04	1.02	0.73	0.91	0.95	1.72	1.59
St. Catharines	25	885	129	43	403	178	10
% of total	1.53	1.68	1.60	1.87	1.64	2.33	0.89
Sarnia	13	625	75	18	330	86	6
% of total	0.80	1.19	0.93	0.78	1.34	1.13	0.53
Sault Ste. Marie	8	423	40	20	187	111	5
% of total	0.49	0.80	0.50	0.87	0.76	1.45	0.44
Welland	6	229	33	11	122	13	2
% of total	0.37	0.44	0.41	0.48	0.50	0.17	0.18
Total	213	8,168	1,007	292	3,579	1,743	145
% of total	13.06	15.52	12.49	12.67	14.56	22.83	12.85

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

Pharm.	Medical and dental techs.	Optom., other, osteo. and chiro.	Dietitians	Social welfare workers	Attendants— doctors' and dentists' offices	Home nursing assistants and aides	Opticians	Population
16	21	10	5	17	6	97	23	30,655
0.54	0.43	0.89	0.60	0.41	0.33	0.40	3.01	0.4
31	46	13	12	45	12	442	8	55,201
1.04	0.94	1.16	1.45	1.08	0.66	1.84	1.05	0.8
28	35	18	2	29	22	75	1	47,008
0.94	0.71	1.61	0.24	0.69	1.22	0.31	0.13	0.7
16	31	6	7	34	6	238	4	43,639
0.54	0.63	0.54	0.84	0.81	0.33	0.99	0.52	0.6
19	61	6	3	28	12	306	7	45,214
0.64	1.24	0.54	0.36	0.67	0.66	1.27	0.92	0.7
18	52	9	14	27	10	356	6	39,838
0.60	1.06	0.80	1.69	0.65	0.55	1.48	0.79	0.6
41	114	9	22	55	24	562	6	53,526
1.37	2.33	0.80	2.65	1.31	1.33	2.34	0.79	0.8
29	36	16	7	35	27	336	6	62,415
0.97	0.73	1.43	0.84	0.84	1.50	1.40	0.79	1.0
26	47	9	6	27	17	228	6	47,185
0.87	0.96	0.80	0.72	0.65	0.94	0.95	0.79	0.7
25	46	4	5	36	12	342	4	45,276
0.84	0.94	0.36	0.60	0.86	0.66	1.42	0.52	0.7
42	64	16	8	49	35	298	15	84,472
1.41	1.31	1.43	0.96	1.17	1.94	1.24	1.96	1.3
28	71	11	4	26	11	214	2	50,976
0.94	1.45	1.43	0.48	0.62	0.61	0.89	0.26	0.8
25	26	9	4	22	9	172	3	43,088
0.84	0.53	0.80	0.48	0.53	0.50	0.72	0.39	0.6
18	20	10	3	18	12	150	1	36,079
0.60	0.41	0.89	0.36	0.43	0.66	0.62	0.13	0.5
362	670	146	102	448	215	3,816	92	684,572
12.13	13.67	13.05	12.30	10.74	11.92	15.87	12.04	10.9

TABLE A234

**Numbers Employed in Various Health Services for Incorporated Cities, Towns
and Villages of Population 10,000 to 30,000, Ontario, 1961**

	Total health pros.	Phys. and surgs.	Dentists	Pharm.	Grad. nurses.	Nurses in training	Medical and Dental techs.	All other health pros.	Nursing assistants and aides	Population
Barrie	256	32	15	10	103	71	7	18	53	21,169
Brampton	125	25	7	9	61	2	10	11	52	18,467
Brockville	436	33	7	11	232	93	9	51	242	17,744
Chatham	417	40	11	10	181	118	28	29	138	29,826
Cobourg	113	11	6	2	73	7	3	11	128	10,646
Dundas	124	20	5	8	66	10	2	13	36	12,912
Eastview	131	21	5	7	69	2	14	13	96	24,555
Forest Hill	528	227	72	78	74	6	28	43	35	20,489
Galt	229	27	9	4	101	64	11	13	84	27,830
Georgetown	45	7	2	3	23	4	1	5	10	10,298
Kenora	97	11	4	5	61	2	8	6	55	10,904
Kirkland Lake	137	18	5	6	83	4	11	10	68	10,000
Leaside	244	57	21	27	122	17	17	39	32	18,579
Lindsay	96	19	6	4	51	2	8	6	64	11,399
Long Branch	50	4	1	1	29	—	3	12	38	11,039

Mimico	171	21	3	5	96	1	16	29	69	18,212
New Toronto	88	5	2	2	38	25	5	11	72	13,384
Niagara Falls	259	20	5	14	95	88	12	25	79	22,351
North Bay	344	40	9	12	146	88	19	30	117	23,781
Oakville	117	15	6	4	75	1	5	11	29	10,366
Orillia	218	32	12	10	86	42	13	23	323	15,345
Owen Sound	201	23	12	17	89	30	7	23	82	17,421
Penbroke	199	18	4	5	135	6	15	16	83	16,791
Port Colborne	86	15	3	6	53	—	2	10	35	14,886
Preston	83	9	5	7	50	2	3	7	51	11,577
Richmond Hill	103	11	3	5	50	4	7	23	28	16,446
Riverside	208	45	12	11	88	14	20	18	45	18,089
St. Thomas	365	32	11	14	181	75	15	37	417	22,469
Stratford	220	25	9	14	91	49	15	17	98	20,467
Timmins	181	28	7	7	62	43	15	19	80	29,270
Trenton	83	15	3	7	48	—	6	4	22	13,183
Waterloo	163	31	14	7	79	6	10	16	44	21,366
Whitby	188	18	7	8	89	38	2	26	159	14,685
Woodstock	323	36	8	7	137	55	29	51	234	20,486
Total	6,628	991	311	347	3,017	969	387	676	3,198	596,432
% of total	12.60	12.29	13.50	11.62	12.27	12.69	7.89	8.44	13.30	9.5

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupations by Sex, Queen's Printer, Ottawa, 1961.

TABLE A235
Numbers Employed in Various Health Services for the Census Metropolitan Areas,
Ontario, 1966

	Hospitals, or clinics with physio- therapy facilities											
	Dentists	Dental hygienists	Optome- trists	Podia- trists	Physio- therapists	Psycho- logists	Dental special- ists	Reg. masseurs	Reg. chiro- practors	Population of metro area		
Hamilton	138	9	24	9	56	17	14	12	13	17	449,116	
% of total in Ontario	5.06	4.13	3.91	12.00	5.77	6.82	4.30	7.27	3.39	3.22	6.4	
London	93	6	15	4	30	7	38	7	12	17	207,396	
% of total	3.41	2.75	2.45	5.33	3.09	2.81	11.67	4.24	3.13	3.22	2.9	
Ottawa	179	4	26	5	60	18	44	18	20	17	494,535	
% of total	6.57	1.83	4.24	6.67	6.18	7.22	13.51	10.91	5.22	3.22	7.1	
Toronto	1,107	126	153	29	422	65	145	98	216	164	1,881,691	
% of total	40.63	57.71	24.94	38.66	43.47	26.07	44.52	59.39	56.38	31.05	27.0	
Windsor	59	3	16	2	16	7	12	4	6	9	211,697	
% of total	2.17	1.37	2.61	2.67	1.65	2.81	3.68	2.42	1.57	1.70	3.0	
Kitchener	49	4	8	2	14	6	2	5	7	9	192,275	
% of total	1.80	1.83	1.30	2.67	1.44	2.41	0.61	3.03	1.83	1.70	2.7	
Sudbury	29	—	7	—	6	5	3	2	4	8	117,075	
% of total	1.06	—	1.14	—	0.62	2.01	0.92	1.21	1.04	1.51	1.6	
Total	1,654	152	249	51	604	125	258	146	278	241	3,553,785	
% of Ontario	60.70	69.72	40.59	67.98	62.21	50.13	79.21	88.48	72.56	45.62	51.0	

SOURCE: See Table A227.

TABLE A236

Numbers Employed in Various Health Services for Cities and Towns of Population
30,000 to 100,000, Ontario, 1966

	Dentists	Dental hygienists	Optome- trists	Podia- trists	Physio- therapists	Hosps. or clinics with physio- therapy facilities	Psycho- logists	Dental special- ists	Reg. masseurs	Chiro- practors	Population
Belleville	15 0.55	1 0.46	4 0.65	1 1.33	4 0.41	2 0.80	—	—	1 0.26	4 0.76	32,785 0.4
Brampton	14 0.51	1 0.46	3 0.49	—	6 0.62	2 0.80	1 0.31	—	—	3 0.57	36,264 0.5
Brantford	26 0.95	3 1.37	10 1.63	2 2.67	17 1.75	4 1.60	1 0.31	1 0.61	4 1.04	9 1.70	59,854 0.8
Burlington	25 0.92	5 2.29	4 0.65	—	17 1.75	2 0.80	1 0.31	2 1.21	—	3 0.57	65,941 0.9
Chatham	15 0.55	1 0.46	5 0.82	1 1.33	3 0.31	3 1.20	—	—	—	3 0.57	32,424 0.4
Cornwall	14 0.51	—	7 1.14	—	4 0.41	5 2.01	—	—	—	2 0.38	45,766 0.6
Fort William	19 0.70	1 0.46	5 0.82	1 1.33	2 0.21	3 1.20	—	—	1 0.26	4 0.76	48,208 0.6
Galt	14 0.51	—	3 0.49	1 1.33	1 0.10	1 0.40	—	—	1 0.26	3 0.57	33,491 0.4
Guelph	22 0.81	1 0.46	3 0.49	1 1.33	7 0.72	4 1.60	5 1.54	—	3 0.78	5 0.95	51,377 0.7
Kingston	37 1.36	3 1.37	4 0.65	2 2.67	16 1.65	6 2.41	9 2.76	2 1.21	2 0.52	1 0.19	59,004 0.8

SOURCE: See Table A227.

TABLE A236 (Continued)
Numbers Employed in Various Health Services for Cities and Towns of Population
30,000 to 100,000, Ontario, 1966

	Dentists	Dental hygienists	Optometrists	Podiatrists	Physiotherapists	Hospitals, or clinics with physiotherapy facilities	Psychologists	Dental specialists	Reg. masseurs	Chiropractors	Population
Niagara Falls	24 0.88	—	7 1.14	1 1.33	5 0.52	1 0.40	—	1 0.61	—	6 1.14	56,891 0.8
Oakville	23 0.84	1 0.46	4 0.65	1 1.33	19 1.96	2 0.80	5 1.54	1 0.61	2 0.52	3 0.57	52,793 0.7
Oshawa	26 0.95	4 1.83	6 0.98	1 1.33	13 1.34	2 0.80	—	1 0.61	2 0.52	6 1.14	78,082 1.1
Peterborough	33 1.21	2 0.92	3 0.49	1 1.33	14 1.44	5 2.01	2 0.61	2 1.21	5 1.31	5 0.95	56,177 0.8
Port Arthur	21 0.77	1 0.46	3 0.49	—	4 0.41	2 0.80	1 0.31	—	1 0.26	2 0.38	48,340 0.6
Sarnia	25 0.92	2 0.92	4 0.65	1 1.33	12 1.24	4 1.60	2 0.61	1 0.61	4 1.04	7 1.33	54,552 0.7
Sault Ste. Marie	25 0.92	—	5 0.82	1 1.33	7 0.72	4 1.60	—	1 0.61	1 0.26	3 0.57	74,594 1.0
St. Catharines	24 0.88	2 0.92	4 0.65	2 2.67	12 1.24	5 2.01	3 0.92	2 1.21	3 0.78	15 2.84	97,101 1.3
Welland	13 0.48	1 0.46	5 0.82	1 1.33	1 0.10	1 0.40	1 0.31	1 0.61	4 1.04	4 0.76	39,960 0.5
Total	415 15.23	29 13.30	89 14.51	18 23.99	164 16.89	58 23.26	31 9.52	15 9.09	34 8.87	88 16.66	1,023,604 14.7

SOURCE: See Table A227.

TABLE A237

Numbers Employed in Various Health Services for Incorporated Towns and Villages of Population 10,000 to 30,000, Ontario, 1966

	Dentists	Dental hygienists	Optometrists	Podiatrists	Physiotherapists	Hosps. or clinics with physiotherapy facilities	Psychologists	Dental specialists	Reg. masseurs	Chiropractors	Population
Aurora	6	1	—	—	1	—	—	—	—	2	10,425
Barrie	19	3	3	1	4	1	—	1	2	5	24,016
Brockville	9	—	—	—	2	2	2	—	—	1	19,266
Cobourg	5	—	2	—	1	1	—	—	—	2	11,524
Dundas	6	1	1	—	4	—	1	—	—	5	15,501
Eastview	3	—	1	—	—	—	—	—	—	—	24,269
Georgetown	6	1	2	—	1	1	1	—	1	3	11,832
Kapuskasing	4	—	1	—	—	—	—	—	—	1	12,617
Kenora	7	—	2	—	1	1	—	—	—	1	11,295
Lindsay	7	—	3	—	1	1	—	—	—	3	12,090
Midland	5	—	3	—	1	1	—	—	—	1	10,129
North Bay	18	—	7	1	7	2	—	—	—	3	23,635
Orillia	12	1	6	—	2	1	5	—	—	2	15,295
Owen Sound	13	—	6	—	1	1	—	—	—	4	17,769
Pembroke	8	—	4	—	2	1	—	—	—	2	16,262
Port Colborne	6	—	2	—	1	1	—	—	—	1	17,986
Preston	5	1	1	—	—	—	1	—	—	2	13,380
Richmond Hill	9	—	2	—	1	1	1	—	—	3	19,773
St. Thomas	16	—	4	—	2	1	4	—	—	3	22,983
Stratford	11	—	3	—	2	1	1	—	1	4	23,068
Timmins	8	—	3	—	1	—	—	—	1	2	29,303
Trenton	7	—	3	—	1	1	—	—	—	2	13,746
Wallaceburg	3	—	2	—	1	1	—	—	—	—	10,696
Waterloo	8	1	2	—	6	1	6	—	—	6	29,889
Whitby	9	—	2	—	1	1	—	—	1	1	17,273
Woodstock	16	1	4	—	1	—	—	1	—	6	24,027
Total	226	10	68	2	45	21	22	2	7	65	458,049
% of Ontario	8.29	4.59	11.08	2.67	4.64	8.42	6.75	1.21	1.83	12.30	6.5

SOURCE: See Table A227.

TABLE A238

Health Regions of Ontario

—(Public Health Division of the Ontario Department of Health.)

-
- 1) Essex, Kent, Lambton, Middlesex, Elgin, Oxford, Norfolk, Haldimand.
 - 2) Welland, Lincoln, Wentworth, Waterloo, Perth, Huron, Wellington, Dufferin.
 - 3) Halton, Peel, York, Ontario, Simcoe, Grey, Bruce.
 - 4) Durham, Victoria, Haliburton, Peterborough, Northumberland, Prince Edward, Hastings, Lennox and Addington, Renfrew, Frontenac, Leeds, Lanark, Carleton, Grenville, Dundas, Stormont, Russell, Glengarry, Prescott.
 - 5) All others.
-

SOURCE: Ontario Department of Health.

TABLE A239
Numbers and Percentages Employed in Various Health Professions by the Health Regions of Ontario, 1961

Health region	Popu- lation	Phys. and surgeons	Dentists	Grad. nurses	Nurses in training	Phys. and occup. thera- pists	Optome- trists	Osteo- paths and chiro- practors	Pharma- cists	Medical and dental techs.	Other health profes- sions	Hospitals	Hosp. beds
1	883,231	1,145	272	2,498	1,439	170	41	75	401	758	27	36	12,114
% of total	14.1	14.20	11.80	10.16	18.85	15.06	9.90	15.15	13.43	15.46	12.85	11.65	19.80
2	1,039,060	1,170	370	3,960	1,477	139	66	101	467	619	26	45	9,835
% of total	16.6	14.51	16.06	16.11	19.35	12.32	15.94	20.40	15.64	12.63	12.38	14.56	16.08
3	2,333,857	3,618	1,104	9,212	2,159	548	171	223	1,459	2,258	117	83	18,686
% of total	37.4	44.86	47.91	37.48	28.28	48.55	41.30	45.05	48.88	46.06	55.70	26.86	30.54
4	1,052,838	1,344	323	4,400	1,524	177	56	52	373	757	26	58	12,476
% of total	16.8	16.67	14.02	17.90	19.96	15.68	13.52	10.50	12.50	15.44	12.38	18.77	20.39
5	927,106	763	230	4,506	988	94	80	44	281	495	14	87	8,065
% of total	14.8	9.46	9.98	18.33	12.94	8.33	19.32	8.89	9.41	10.10	6.67	28.15	13.18
Ontario	6,236,092	8,040	2,299	24,576	7,587	1,128	414	495	2,981	4,887	210	309	61,176

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupation by Sex, Queen's Printer, Ottawa, 1961.

TABLE A240
Numbers and Percentages Employed in Various Health Professions by the Health Regions of Ontario, 1966

Health region	Population	Dentists	Rec. dental specialists	Pharmacies	Physiotherapists	Occupational therapists	Care or education centres for speech or hearing	Physicians G.P.	Physicians Cert. Spec.	Total	Reg. masseurs	Chiropractors	Radiol. techs. in Ont. Assoc.	Hospitals	Hosp. beds
1	953,495	299	13	251	74	24	8	596	477	1,073	30	66	159	37	13,589
% of total	13.6	11.42	7.88	13.38	7.75	12.63	10.26	14.42	13.31	13.84	7.83	12.49	14.79	11.86	19.63
2	1,162,099	403	23	322	131	18	11	672	533	1,205	39	104	184	46	12,239
% of total	16.6	15.39	13.94	17.16	13.72	9.47	14.10	16.26	14.87	15.54	10.18	19.69	17.11	14.74	17.68
3	2,756,767	1,304	103	834	571	112	34	1,748	1,670	3,418	268	214	363	89	21,598
% of total	39.6	49.81	62.42	44.45	59.78	58.95	43.59	42.30	46.59	44.09	69.95	40.51	33.76	28.52	31.20
4	1,201,826	368	22	293	113	30	17	630	688	1,318	30	61	214	59	13,434
% of total	17.2	14.06	13.33	15.62	11.83	15.79	21.79	15.25	19.20	17.00	7.83	11.55	19.90	18.91	19.41
5	886,683	242	1	218	63	6	9	470	275	745	16	36	130	81	8,360
% of total	12.7	9.24	0.61	11.62	6.60	3.16	11.54	11.37	7.67	9.61	4.18	6.81	12.09	25.96	12.01
Ontario	6,960,870	2,616	165	1,875	955	190	78	4,116	3,583	7,699	383	528	1,075	312	69,220

SOURCE: See Table A227.

TABLE A241

Economic Regions of Ontario

-
- 1) Carleton, Russell, Renfrew, Lanark, Prescott, Stormont, Dundas, Glengarry, Grenville, Leeds, Frontenac.
 - 2) Lennox-Addington, Prince Edward, Hastings, Northumberland, Durham, Peterborough, Haliburton, Victoria.
 - 3) York, Ontario, Peel, Halton.
 - 4) Wentworth, Lincoln, Welland, Haldimand, Brant.
 - 5) Norfolk, Oxford, Middlesex, Elgin.
 - 6) Essex, Kent, Lambton.
 - 7) Waterloo, Wellington, Perth, Huron.
 - 8) Bruce, Gray, Dufferin, Simcoe, Muskoka, Parry Sound.
 - 9) Nipissing, Timiskaming, Cochrane, Sudbury, Manitoulin, Algoma.
 - 10) Thunder Bay, Rainy River, Kenora.
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SOURCE: Ontario Department of Economics and Development, Special Research and Surveys Branch.

TABLE A242
Numbers and Percentages Employed in Various Health Professions by Economic Regions of Ontario, 1961

Economic regions	Popu- lation	Phys. and surgeons	Dentists	Grad. nurses	Nurses in training	Phys. and occup. thera- pists	Optome- trists	Osteo- paths and chiro- practors	Pharma- cists	Medical and dental techs.	Other health profes- sions	Hospitals	Hosp. beds
1	782,531	1,112	250	3,482	1,231	153	46	25	285	640	24	46	11,618
% of total	12.5	13.79	10.85	14.17	16.13	13.56	11.11	5.05	9.55	23.06	11.43	14.89	18.99
2	258,688	278	88	1,124	309	29	19	29	108	140	3	18	1,457
% of total	4.1	3.45	3.82	4.57	4.05	2.57	4.59	5.86	3.62	2.86	1.43	5.82	2.38
3	2,087,545	3,413	1,024	8,413	1,981	538	154	199	1,371	2,164	114	65	16,338
% of total	33.4	42.32	44.44	34.23	25.95	47.67	37.19	40.20	45.93	44.15	54.28	21.03	26.71
4	762,288	889	278	3,036	1,092	119	42	66	382	495	17	27	6,440
% of total	12.2	11.02	12.07	12.35	14.31	10.54	10.14	13.33	12.80	10.10	8.09	8.74	10.53
5	405,258	628	127	2,023	773	127	35	45	175	381	16	19	8,957
% of total	6.4	7.79	5.51	8.23	10.13	11.25	8.45	9.09	5.86	7.77	7.62	6.15	14.64
6	449,776	517	139	1,780	660	47	30	27	216	371	11	13	2,696
% of total	7.2	6.41	6.03	7.24	8.65	4.16	7.25	5.45	7.24	7.57	5.24	4.21	4.41
7	372,713	286	121	1,331	552	35	30	45	122	185	10	20	2,476
% of total	5.9	3.55	5.25	5.42	7.23	3.10	7.25	9.09	4.09	3.77	4.76	6.47	4.05
8	318,744	259	99	1,016	191	11	19	29	112	117	3	30	4,485
% of total	5.1	3.21	4.30	4.13	2.50	0.97	4.59	5.86	3.75	2.39	1.43	9.71	7.33
9	505,651	350	118	982	578	42	27	24	135	239	8	41	3,839
% of total	8.1	4.34	5.12	4.00	7.57	3.72	6.52	4.85	4.52	4.88	3.81	13.27	6.28
10	216,523	176	55	832	220	27	9	6	68	155	4	30	2,850
% of total	3.4	2.18	2.39	3.39	2.88	2.39	2.17	1.21	2.28	3.16	1.90	9.71	4.66
Ontario	6,236,092	8,040	2,299	24,576	7,587	1,128	414	495	2,981	4,887	210	309	61,176

SOURCE: DBS, *Census of Canada*, Series 3.1 Labour Force — Occupation by Sex, Queen's Printer, Ottawa, 1961.

TABLE A243
Numbers and Percentages Employed in Various Health Professions, by Economic Regions of Ontario, 1966

Economic regions	Popu- lation	Den- tists	Rec. dental special- ists	Phar- macists	Physio- thera- pists	Occup. thera- pists	Care or educa- tion centres for			Physicians		Chiro- prac- tors	Radiol. techs. in Ont. Assoc.	Hospitals	Hosp. beds
							speech or hearing	G.P.	Cert. spec.	Total	Reg. mass- eurs				
1	850,923	299	20	185	88	27	13	474	592	1,066	23	32	172	46	12,248
% of total	12.2	11.42	12.12	9.86	9.21	14.21	16.67	11.47	16.52	13.75	6.00	6.06	6.0	14.74	17.69
2	350,903	88	2	126	27	3	4	188	103	291	37	26	57	19	1,783
% of total	5.0	3.36	1.21	6.72	2.83	1.58	5.13	4.55	2.87	3.75	9.66	4.92	5.30	6.09	2.58
3	2,501,958	1,222	102	743	553	110	34	1,590	1,622	3,212	229	188	349	69	18,565
% of total	35.9	46.68	61.81	39.60	57.90	57.89	43.59	38.48	45.25	41.43	59.77	35.59	32.46	22.11	26.82
4	840,181	292	18	235	114	15	9	498	411	909	27	66	146	26	7,780
% of total	12.0	11.15	10.91	12.53	11.94	7.89	11.54	12.05	11.47	11.73	7.05	12.49	13.58	8.33	11.25
5	437,911	157	8	122	37	16	4	277	263	540	15	24	81	20	9,059
% of total	6.2	6.00	4.85	6.50	3.87	8.42	5.13	6.70	7.34	6.97	3.92	4.54	7.53	6.41	13.09
6	485,564	135	5	119	37	8	4	303	211	514	14	30	74	13	3,981
% of total	6.9	5.16	3.03	6.34	3.87	4.21	5.13	7.33	5.89	6.63	3.65	5.68	6.88	4.17	5.75
7	425,775	141	6	112	33	4	4	225	163	388	15	48	60	22	3,449
% of total	6.1	5.39	3.64	5.97	3.46	2.11	5.13	5.45	4.55	5.01	3.92	9.09	5.58	7.05	4.98
8	327,943	107	1	133	26	2	—	213	57	270	13	33	29	32	5,489
% of total	4.7	4.09	0.61	7.09	2.72	1.05	—	5.15	1.59	3.48	3.39	6.25	2.70	10.26	7.94
9	516,228	102	—	108	26	2	4	244	145	389	6	16	91	39	3,967
% of total	7.4	3.90	—	5.76	2.72	1.05	5.13	5.90	4.05	5.02	1.57	3.03	8.46	12.50	5.73
10	223,484	63	—	49	11	3	2	104	76	180	2	10	16	28	3,049
% of total	3.2	2.41	—	2.61	1.15	1.58	2.56	2.52	2.12	2.32	0.52	1.89	1.49	8.97	4.40
Ontario	6,960,870	2,616	165	1,875	955	190	78	4,116	3,583	7,699	383	528	1,075	312	69,220

SOURCE: See Table A227.

TABLE A244
Numbers and Percentages Employed in Various Health Professions, by County,
Ontario, 1961

County or census division	Popu- lation	Phys. and surgeons	Dentists	Grad. nurses	Nurses in training	Phys. and occup. thera- pists	Optome- trists	Osteo- paths and chiro- practors	Pharma- cists	Medical and dental techs. (incl. x-ray)	Other health profes- sions	Hospitals	Hosp. beds
Algoma % of total	111,408 1.7	72 0.89	32 1.39	321 1.31	119 1.56	6 0.53	5 1.21	7 1.41	38 1.27	42 0.86	2 0.95	9 2.91	540 0.88
Brant % of total	83,839 1.3	92 1.14	27 1.17	411 1.67	166 2.17	13 1.15	6 1.45	8 1.62	35 1.17	59 1.20	1 0.48	4 1.29	460 0.75
Bruce % of total	43,036 0.6	29 0.36	12 0.52	105 0.43	7 0.09	—	2 0.48	4 0.81	16 0.54	9 0.18	—	6 1.94	177 0.31
Carleton % of total	352,932 5.6	627 7.77	135 5.86	1,628 6.62	622 8.15	68 6.02	20 4.83	12 2.42	148 4.96	336 6.85	17 8.09	9 2.91	3,085 5.04
Cochrane % of total	95,666 1.5	67 0.83	21 0.91	208 0.85	58 0.76	8 0.71	5 1.21	3 0.61	19 0.64	40 0.82	—	12 3.88	603 0.99
Dufferin % of total	16,095 0.2	12 0.15	4 0.17	58 0.24	5 0.07	—	1 0.24	1 0.20	8 0.27	4 0.08	—	6 1.94	1,840 3.01
Dundas % of total	17,162 0.2	12 0.15	9 0.39	48 0.20	3 0.04	—	1 0.24	—	5 0.17	6 0.12	—	1 0.32	63 0.10
Durham % of total	39,916 0.6	25 0.31	11 0.48	126 0.51	3 0.04	8 0.71	2 0.48	3 0.61	9 0.30	12 0.24	—	2 0.65	99 0.16
Elgin % of total	62,862 1.0	72 0.89	17 0.74	274 1.11	91 1.19	28 2.48	3 0.72	4 0.81	23 0.77	33 0.67	2 0.95	2 0.65	2,204 3.60
Essex % of total	258,218 4.1	328 4.07	89 3.86	1,003 4.08	429 5.62	35 3.10	15 3.62	10 2.02	137 4.59	234 4.77	7 3.33	7 2.27	1,516 2.48
Frontenac % of total	87,534 1.4	232 2.88	34 1.48	597 2.43	330 4.32	49 4.34	2 0.48	2 0.40	48 1.61	130 2.65	5 2.38	9 2.91	2,961 4.84

Glengarry % of total	19,217 0.3	11 0.14	2 0.09	34 0.14	1 0.01	—	—	—	1 0.03	2 0.04	—	2 0.65	57 0.09
Grenville % of total	22,864 0.3	16 0.20	6 0.26	67 0.27	6 0.08	1 0.09	1 0.24	—	10 0.34	10 0.20	—	2 0.65	63 0.10
Grey % of total	62,005 0.9	52 0.64	18 0.78	197 0.80	44 0.58	4 0.35	7 1.69	6 1.21	25 0.84	22 0.45	1 0.48	6 1.94	331 0.54
Haldimand % of total	28,197 0.4	17 0.21	6 0.26	54 0.22	6 0.08	2 0.18	1 0.24	3 0.61	10 0.34	6 0.12	—	4 1.29	461 0.75
Haliburton % of total	8,928 0.1	4 0.05	1 0.04	15 0.06	—	1 0.09	—	—	3 0.10	—	—	2 0.65	17 0.03
Haltoun % of total	106,967 1.7	125 1.55	42 1.82	407 1.66	24 0.31	14 1.24	11 2.66	11 2.22	48 1.61	61 1.24	3 1.43	3 0.97	272 0.46
Hastings % of total	93,377 1.4	73 0.91	19 0.82	291 1.18	125 1.64	5 0.44	7 1.69	6 1.21	31 1.04	28 0.57	1 0.48	1 0.32	22 0.04
Huron % of total	53,805 0.8	37 0.46	8 0.35	159 0.65	38 0.50	2 0.18	5 1.21	7 1.41	12 0.40	10 0.20	—	5 1.62	313 0.51
Kenora % of total	51,474 0.8	35 0.43	9 0.39	170 0.69	3 0.04	1 0.09	2 0.48	1 0.20	8 0.27	29 0.59	—	9 2.91	250 0.41
Kent % of total	89,427 1.4	83 1.03	22 0.95	314 1.28	130 1.70	6 0.53	10 2.42	10 2.02	34 1.14	50 1.02	2 0.95	3 0.97	521 0.85
Lambton % of total	102,131 1.6	106 1.31	28 1.22	463 1.88	101 1.32	6 0.53	5 1.21	7 1.41	45 1.50	87 1.77	2 0.95	3 0.97	659 1.08
Lanark % of total	40,313 0.6	40 0.50	14 0.61	214 0.87	3 0.04	10 0.89	5 1.21	4 0.81	9 0.30	32 0.65	1 0.48	7 2.27	2,350 3.84
Leeds % of total	46,889 0.7	52 0.64	16 0.69	321 1.31	104 1.36	20 1.77	3 0.72	1 0.20	25 0.84	26 0.53	—	4 1.29	1,869 3.06
Lennox and Addington % of total	23,717 0.3	13 0.16	5 0.22	33 0.13	3 0.04	2 0.18	1 0.24	3 0.61	5 0.17	5 0.10	1 0.48	—	—
Lincoln % of total	126,674 2.0	167 2.07	55 2.39	522 2.12	186 2.44	17 1.51	6 1.45	12 2.42	57 1.9	79 1.61	2 0.95	7 2.27	846 1.38

SOURCE: See Table A227.

TABLE A244 (Continued)
Numbers and Percentages Employed in Various Health Professions, by County, Ontario, 1961

County or census division	Population	Phys. and surgeons	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Optometrists	Osteopaths and chiropractors	Pharmacists	Medical and dental techs. (incl. x-ray)	Other health professions	Hospitals	Hosp. beds
Manitoulin % of total	11,176 0.1	5 0.06	3 0.13	24 0.10	—	—	—	—	2 0.07	2 0.04	—	3 0.97	73 0.12
Middlesex % of total	221,422 3.5	462 5.73	79 3.43	1,359 5.53	591 7.74	70 6.20	19 4.59	30 6.06	121 4.05	274 5.59	11 5.24	11 3.56	4,755 7.77
Muskoka % of total	26,705 0.4	22 0.27	10 0.43	69 0.28	3 0.04	—	3 0.72	3 0.61	9 0.30	5 0.10	—	3 0.97	147 0.24
Nipissing % of total	70,568 1.1	60 0.74	17 0.74	272 1.12	113 1.48	8 0.71	4 0.97	5 1.01	26 0.87	43 0.88	1 0.48	6 1.94	1,191 1.95
Norfolk % of total	50,475 0.8	25 0.31	12 0.52	110 0.45	15 0.20	4 0.35	7 1.69	5 1.01	8 0.27	0.18	—	1 0.32	106 0.17
Northumberland % of total	41,892 0.6	30 0.37	9 0.39	157 0.64	10 0.13	4 0.35	3 0.72	2 0.40	15 0.50	13 0.27	1 0.48	4 1.29	536 0.88
Ontario % of total	135,895 2.1	128 1.59	40 1.74	533 2.17	141 1.85	23 2.04	11 2.66	10 2.02	50 1.68	56 1.14	2 0.95	5 1.62	2,002 3.27
Oxford % of total	70,499 1.1	69 0.86	19 0.82	280 1.14	76 1.00	25 2.22	6 1.45	6 1.21	23 0.77	65 1.33	3 1.43	5 1.62	1,892 3.09
Parry Sound % of total	29,632 0.4	20 0.25	5 0.22	90 0.37	5 0.07	1 0.09	1 0.24	1 0.20	7 0.23	14 0.29	—	3 0.97	150 0.25
Peel % of total	111,575 1.7	131 1.62	43 1.87	293 1.19	18 0.24	11 0.97	9 2.17	15 3.03	47 1.57	54 1.10	3 1.43	3 0.97	202 0.33
Perth % of total	57,452 0.9	51 0.63	17 0.74	182 0.74	55 0.72	2 0.18	6 1.45	8 1.62	27 0.90	26 0.53	1 0.48	3 0.97	363 0.59
Peterborough % of total	76,375 1.2	87 1.08	33 1.43	369 1.50	161 2.11	7 0.62	2 0.48	9 1.82	35 1.17	66 1.35	—	3 0.97	551 0.90

Prescott % of total	27,226 0.4	19 0.24	5 0.22	40 0.16	3 0.04	—	1 0.24	—	1 0.03	7 0.14	—	2 0.65	57 0.09
Prince Edward % of total	21,108 0.3	18 0.22	4 0.17	41 0.16	2 0.03	—	2 0.48	2 0.40	5 0.17	6 0.12	—	1 0.32	55 0.09
Rainy River % of total	26,531 0.4	16 0.20	6 0.26	70 0.28	1 0.01	—	3 0.72	1 0.20	11 0.37	11 0.22	—	8 2.59	251 0.41
Renfrew % of total	89,635 1.4	47 0.58	16 0.69	321 1.31	41 0.54	2 0.18	8 1.93	4 0.81	19 0.64	52 1.06	1 0.48	6 1.94	486 0.79
Russell % of total	20,892 0.3	8 0.10	1 0.04	7 0.03	1 0.01	—	—	—	1 0.03	2 0.04	—	—	—
Simcoe % of total	141,271 2.2	124 1.54	50 2.17	497 2.02	127 1.66	6 0.53	8 1.93	14 2.83	47 1.57	63 1.29	2 0.95	6 1.94	1,840 3.01
Stormont % of total	57,867 0.9	48 0.60	12 0.52	223 0.91	117 1.53	3 0.27	5 1.21	2 0.40	18 0.60	37 0.75	—	4 1.29	627 1.02
Sudbury % of total	165,862 2.6	146 1.81	34 1.48	539 2.19	263 3.45	19 1.68	7 1.69	6 1.21	40 1.34	88 1.80	5 2.38	7 2.27	1,027 1.68
Thunder Bay % of total	138,518 2.2	125 1.55	40 1.74	592 2.41	216 2.83	26 2.30	4 0.97	4 0.81	49 1.64	115 2.35	4 1.90	13 4.21	2,349 3.86
Timiskaming % of total	50,971 0.8	40 0.50	11 0.48	157 0.64	25 0.33	1 0.09	6 1.45	3 0.61	12 0.40	24 0.49	—	4 1.29	405 0.66
Victoria % of total	29,750 0.4	28 0.35	6 0.26	92 0.37	5 0.07	2 0.18	2 0.48	4 0.81	10 0.34	10 0.20	—	5 1.62	177 0.29
Waterloo % of total	176,754 2.8	198 2.46	63 2.73	579 2.36	293 3.84	18 1.59	15 3.62	21 4.24	48 1.61	80 1.63	6 2.85	6 1.94	930 1.52
Welland % of total	164,741 2.6	148 1.84	48 2.08	585 2.38	139 1.82	12 1.06	10 2.42	18 3.64	85 2.85	95 1.94	5 2.38	4 1.29	766 1.25
Wellington % of total	84,702 1.4	92 1.14	33 1.43	411 1.67	166 2.17	13 1.15	4 0.97	9 1.82	35 1.17	69 1.41	3 1.43	6 1.94	870 1.42
Wentworth % of total	358,837 5.7	465 5.77	142 6.16	1,464 5.96	595 7.79	75 6.65	19 4.59	25 5.05	195 6.53	256 5.22	9 4.28	8 2.59	3,907 6.39
York % of total	1,733,108 27.7	3,029 37.56	899 39.02	7,180 29.22	1,798 23.55	490 43.41	123 29.70	163 32.93	1,226 41.07	1,993 40.66	106 40.47	54 17.47	13,852 22.64
Ontario total	6,236,092	8,040	2,299	24,576	7,587	1,128	414	495	2,981	4,887	210	309	61,176

SOURCE: See Table A227.

TABLE A245
Numbers and Percentages Employed in Various Health Professions by County,
Ontario, 1966

County or census division	Population	Dentists	Rec. dental spec.	Pharmacies	Physiotherapists	Occupational therapists	Speech and hearing places		Physicians		Reg. masseurs	Chiropractors	Rad. techs. in Ont. Assoc.	Hospitals	Hosp. beds
									G.P.	Spec.					
Algoma % of total	113,561 1.6	28 1.07	—	27 1.44	8 0.84	—	2 2.56	51 1.23	28 0.78	79 1.02	1 0.26	6 1.14	15 1.40	10 3.21	734 1.06
Brant % of total	90,945 1.3	31 1.18	1 0.61	22 1.17	18 1.88	1 0.53	2 2.56	47 1.14	39 1.09	86 1.11	4 1.04	9 1.70	19 1.77	4 1.28	550 0.79
Bruce % of total	43,085 0.6	11 0.42	—	15 0.80	3 0.31	—	—	25 0.61	1 0.03	26 0.34	2 0.52	4 0.76	1 0.09	6 1.92	184 0.27
Carleton % of total	407,463 5.8	184 7.07	18 10.91	84 4.48	58 6.07	9 4.74	10 12.82	230 5.57	339 9.46	569 7.34	20 5.22	17 3.22	90 8.37	10 3.21	3,434 4.96
Cochrane % of total	97,334 1.3	17 0.65	—	19 1.01	2 0.21	—	—	48 1.16	16 0.45	64 0.83	1 0.26	3 0.57	8 0.74	11 3.53	679 0.98
Dufferin % of total	17,108 0.2	8 0.31	—	7 0.37	2 0.21	—	—	12 0.29	1 0.03	13 0.17	1 0.26	2 0.38	1 0.09	6 1.92	2,109 3.05
Dundas % of total	17,106 0.2	6 0.23	—	4 0.21	—	—	—	9 0.22	1 0.03	10 0.13	1 0.26	1 0.19	1 0.09	10 0.32	67 0.10
Durham % of total	44,549 0.6	9 0.34	—	9 0.48	2 0.21	—	—	23 0.56	—	23 0.30	1 1.06	3 0.57	2 0.19	2 0.64	208 0.30
Elgin % of total	61,912 0.8	18 0.69	—	14 0.75	2 0.21	5 2.63	—	34 0.82	23 0.64	57 0.74	—	5 0.95	6 0.56	2 0.64	2,203 3.18
Essex % of total	280,922 4.0	80 3.06	4 2.42	67 3.57	17 1.79	4 2.11	2 2.56	184 4.45	127 3.54	311 4.01	8 2.09	12 2.27	30 2.79	6 1.92	1,755 2.54
Frontenac % of total	97,138 1.3	36 1.38	2 1.21	24 1.28	14 1.47	15 7.89	2 2.56	55 1.33	127 3.54	182 2.35	2 0.52	2 0.38	2 2.98	9 2.88	3,170 4.59

Glengarry % of total	18,181 0.2	6 0.23	—	2 0.11	—	—	—	6 0.15	—	—	—	—	6 0.08	—	—	—	1 0.09	1 0.32	81 0.12
Grenville % of total	23,429 0.3	10 0.38	—	7 0.37	1 0.10	—	—	9 0.22	—	—	—	—	12 0.15	—	—	—	3 0.28	2 0.64	67 0.10
Grey % of total	62,592 0.8	20 0.76	—	25 1.33	3 0.31	—	—	38 0.92	—	—	—	—	17 0.47	2 0.52	8 1.51	—	1 0.09	7 2.24	740 1.07
Haldimand % of total	30,020 0.4	7 0.27	—	10 0.53	—	—	—	16 0.39	—	—	—	—	3 0.08	—	3 0.57	—	4 0.37	4 1.28	549 0.79
Haliburton % of total	7,768 0.1	1 0.04	—	2 0.11	1 0.10	—	—	4 0.10	—	—	—	—	—	—	—	—	5 0.47	2 0.64	17 0.02
Halton % of total	140,800 2.0	53 2.02	3 1.82	36 1.92	43 4.50	—	—	91 2.20	—	—	—	—	65 1.81	4 1.04	11 2.08	—	25 2.33	3 0.96	459 0.66
Hastings % of total	94,127 1.3	22 0.84	—	29 1.55	5 0.52	1 0.53	—	2 2.56	—	—	—	—	31 0.86	1 0.26	7 1.33	—	3 0.28	1 0.32	22 0.03
Huron % of total	54,446 0.7	13 0.50	—	13 0.69	2 0.21	—	—	27 0.65	—	—	—	—	7 0.20	—	6 1.14	—	2 0.19	6 1.92	621 0.90
Kenora % of total	53,995 0.7	12 0.46	—	9 0.48	1 0.10	—	—	30 0.73	—	—	—	—	5 0.14	—	1 0.19	—	5 0.47	8 2.56	286 0.41
Kent % of total	96,406 1.3	26 0.99	—	24 1.28	4 0.42	1 0.53	—	2 2.56	—	—	—	—	24 0.67	—	11 2.08	—	13 1.21	4 1.28	1,520 2.20
Lambton % of total	108,236 1.5	29 1.11	1 0.61	28 1.49	16 1.68	3 1.58	—	57 1.40	—	—	—	—	60 1.67	6 1.57	7 1.33	—	31 2.88	3 0.96	706 1.03
Lanark % of total	41,212 0.5	13 0.50	—	15 0.80	2 0.21	—	—	30 0.73	—	—	—	—	5 0.14	—	3 0.57	—	8 0.74	7 2.24	2,307 3.33
Leeds % of total	49,129 0.7	10 0.38	—	12 0.64	2 0.21	3 1.58	—	35 0.85	—	—	—	—	25 0.70	—	1 0.19	—	7 0.65	4 1.28	1,874 2.71
Lennox and Addington % of total	25,202 0.3	2 0.08	—	3 0.16	1 0.10	—	—	11 0.27	—	—	—	—	1 0.03	—	3 0.57	—	1 0.09	1 0.32	78 0.11
Lincoln % of total	146,099 2.0	53 2.02	3 1.82	36 1.92	14 1.47	1 0.53	—	97 2.35	—	—	—	—	69 1.93	4 1.04	19 3.60	—	5 0.47	7 2.24	1,170 1.69
Manitoulin % of total	10,544 0.1	3 0.11	—	4 0.21	—	—	—	6 0.15	—	—	—	—	—	—	1 0.19	—	1 0.09	2 0.64	61 0.09

SOURCE: See Table A227.

TABLE A245 (Continued)
Numbers and Percentages Employed in Various Health Professions by County, Ontario, 1966

County or census division	Population	Dentists	Rec. dental spec.	Phar- macies	Physio- ther- apists	Occu- pational therapists	Speech and hearing places	Physicians		Reg. mas- seurs	Chiro- prac- tors	Rad. techs. in Ont. Assoc.	Hospitals	Hosp. beds
								G.P.	Spec.					
Middlesex % of total	249,403 3.5	101 3.86	7 4.24	75 4.00	32 3.35	10 5.26	4 5.13	160 3.87	216 6.03	376 4.85	12 3.41	57 5.30	12 3.85	4,818 6.96
Muskoka % of total	27,691 0.3	11 0.42	—	14 0.75	4 0.42	—	—	23 0.56	4 0.11	27 0.35	3 0.57	3 0.28	3 0.96	174 0.25
Nipissing % of total	73,533 1.0	19 0.73	—	16 0.85	3 0.30	—	—	39 0.94	24 0.67	63 0.81	—	14 1.30	5 1.60	1,138 1.64
Norfolk % of total	50,578 0.7	13 0.50	—	12 0.64	—	—	—	27 0.65	4 0.11	31 0.40	1 0.26	5 0.47	1 0.32	106 0.15
Northumberland % of total	45,074 0.6	9 0.34	—	11 0.59	1 0.10	—	—	23 0.56	4 0.11	27 0.35	—	12 1.12	4 1.28	530 0.77
Ontario % of total	170,818 2.4	43 1.64	1 0.61	38 2.03	16 1.68	7 3.68	1 1.28	94 2.27	51 1.42	145 1.87	3 0.78	14 1.30	5 1.60	2,134 3.08
Oxford % of total	76,018 1.0	25 0.96	1 0.61	21 1.12	3 0.31	1 0.53	—	56 1.36	20 0.56	76 0.98	3 0.78	13 1.21	5 1.60	1,932 2.79
Parry Sound % of total	28,335 0.4	6 0.23	—	7 0.37	2 0.21	—	—	20 0.48	4 0.11	24 0.31	2 0.52	11 1.02	3 0.96	173 0.26
Peel % of total	172,321 2.4	51 1.95	—	40 2.13	29 3.04	—	1 1.28	102 2.47	57 1.59	159 2.05	6 1.57	20 1.86	3 0.96	206 0.30
Perth % of total	60,424 0.8	16 0.61	—	19 1.01	2 0.21	—	—	37 0.90	17 0.47	54 0.70	3 0.78	11 1.02	3 0.96	404 0.58
Peterborough % of total	81,959 1.1	34 1.30	2 1.21	18 0.96	15 1.57	2 1.05	2 2.58	35 0.85	58 1.62	93 1.20	5 1.31	28 2.60	3 0.96	626 0.90

Prescott % of total	27,155 0.3	2 0.08	—	7 0.37	1 0.10	—	—	—	18 0.44	1 0.03	9 0.12	—	—	3 0.28	2 0.64	81 0.12
Prince Edward % of total	21,307 0.3	4 0.15	—	6 0.32	1 0.10	—	—	—	16 0.39	2 0.06	18 0.23	—	1 0.19	1 0.09	1 0.32	95 0.14
Rainy River % of total	25,816 0.3	4 0.15	—	7 0.37	3 0.31	—	—	—	11 0.27	1 0.03	12 0.15	—	2 0.38	1 0.09	8 2.56	286 0.41
Renfrew % of total	89,453 1.2	21 0.80	—	19 1.01	5 0.52	—	—	—	43 1.04	8 0.22	51 0.66	—	6 1.14	12 1.12	6 1.92	558 0.81
Russell % of total	21,107 0.3	2 0.08	—	1 0.05	—	—	—	—	9 0.22	—	9 0.12	—	—	2 0.19	—	—
Simcoe % of total	149,132 2.1	51 1.95	1 0.61	51 2.72	12 1.26	2 1.05	—	—	95 2.30	30 0.84	125 1.61	4 1.04	14 2.65	12 1.12	7 2.24	2,109 3.05
Stormont % of total	59,550 0.8	7 0.27	—	10 0.53	5 0.52	—	—	—	30 0.73	23 0.64	53 0.68	—	2 0.38	13 1.21	4 1.28	609 0.89
Sudbury % of total	174,102 2.5	35 1.33	—	28 1.49	6 0.63	1 0.53	—	1 1.28	70 1.69	72 2.01	142 1.83	4 1.04	—	25 2.33	7 2.24	963 1.39
Thunder Bay % of total	143,673 2.0	47 1.79	—	33 1.76	7 0.73	3 1.58	—	2 2.56	63 1.52	70 1.95	133 1.72	2 0.52	7 1.33	10 0.93	12 3.85	2,477 3.58
Timiskaming % of total	47,154 0.6	10 0.38	—	14 0.75	7 0.73	1 0.53	—	1 1.28	30 0.73	5 0.14	35 0.45	—	—	3 2.60	4 1.28	392 0.57
Victoria % of total	30,917 0.4	7 0.26	—	48 2.56	1 0.10	—	—	—	21 0.51	7 0.20	28 0.36	—	3 0.57	5 0.47	5 1.60	207 0.31
Waterloo % of total	216,728 3.1	82 3.13	5 3.03	48 2.56	21 2.20	2 1.05	—	3 3.85	118 2.86	98 2.73	216 2.79	8 2.09	24 4.54	37 3.44	6 1.92	1,348 1.95
Welland % of total	178,818 2.5	50 1.91	2 1.21	60 3.20	12 1.26	1 0.53	—	—	86 2.08	68 1.90	154 1.99	6 1.57	13 2.46	49 4.56	4 1.28	863 1.25
Wellington % of total	94,177 1.3	30 1.15	1 0.61	32 1.71	8 0.84	2 1.05	—	1 1.28	43 1.04	41 1.14	84 1.08	4 1.04	8 1.51	10 0.93	7 2.24	1,076 1.55
Wentworth % of total	394,299 5.6	151 5.77	12 7.27	107 5.70	70 7.33	12 6.32	—	6 7.69	252 6.10	232 6.47	484 6.24	13 3.39	22 4.16	69 6.42	7 2.24	4,648 6.71
York % of total	2,018,019 28.9	1,075 41.07	98 59.39	629 33.53	465 48.69	103 54.21	—	29 37.18	1,303 31.53	1,449 40.43	2,752 35.50	247 64.47	152 28.77	290 26.97	58 18.59	15,766 22.78
Ontario total:	6,960,870	2,616	165	1,875	955	190	—	78	4,116	3,583	7,699	383	528	1,075	312	69,220

SOURCE: See Table A227.

TABLE A246
Number of Health Personnel, Hospital Beds, and Population in Canada, by
County and Census Division, Canada, 1961

	Popu- lation	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharma- cists	Medical, dental, x-ray, techs.	Other health pros.	Hosp. beds
Newfoundland													
Division No. 1	188,904	1,539	139	26	594	536	28	4	1	60	147	4	2,081
Division No. 2	24,779	31	6	1	16	3	—	—	—	1	4	—	60
Division No. 3	23,299	27	9	—	11	1	—	—	—	1	5	—	54
Division No. 4	24,185	31	8	2	14	2	—	—	—	2	3	—	66
Division No. 5	39,086	128	20	5	67	9	3	—	—	7	16	1	377
Division No. 6	38,045	74	17	3	38	7	—	—	—	3	6	—	99
Division No. 7	39,652	24	8	2	7	3	—	—	—	—	4	—	43
Division No. 8	44,659	31	11	2	9	3	—	—	—	1	5	—	107
Division No. 9	21,710	23	5	—	13	—	—	—	—	—	5	—	141
Division No. 10	13,534	25	7	1	14	3	—	—	—	—	—	—	31
Prince Edward Island													
Kings	17,893	47	7	2	24	6	—	—	—	3	5	—	53
Prince	40,894	211	28	9	86	59	1	—	1	13	13	1	226
Queens	45,842	463	56	14	213	111	12	3	1	16	33	4	558
Nova Scotia													
Annapolis	22,649	78	12	4	41	2	—	1	2	9	7	—	138
Antigonish	14,360	214	12	4	77	93	1	—	1	5	21	—	200
Cape Breton	131,507	1,124	89	29	558	304	7	6	2	27	97	5	1,620
Colchester	34,307	203	22	11	119	6	—	4	—	14	15	12	287
Cumberland	37,767	175	25	9	114	5	—	3	—	5	14	—	317
Digby	20,216	54	16	4	25	—	—	1	—	3	5	—	28
Guysborough	13,274	25	6	—	15	1	—	1	—	—	2	—	122
Halifax	225,723	2,544	353	68	1,076	605	48	10	5	90	281	8	3,025
Hants	26,444	128	15	2	66	29	1	1	—	5	9	—	74
Inverness	18,718	77	9	4	47	7	—	1	—	1	8	—	105

Kings	41,747	237	45	8	132	7	1	3	3	13	21	4	541
Lunenburg	34,998	132	24	8	61	14	—	2	3	10	9	1	77
Pictou	43,908	386	30	10	173	126	2	3	1	14	22	5	392
Queens	13,155	47	8	3	27	—	—	1	1	3	4	—	31
Richmond	11,374	21	6	—	8	3	—	—	—	—	4	—	14
Shelburne	15,208	38	9	2	23	—	—	—	—	—	4	—	40
Shelburne	8,266	27	3	—	20	2	—	—	—	—	2	—	49
Victoria	23,386	134	22	5	65	24	—	2	1	5	9	1	163
Yarmouth													
New Brunswick													
Albert	12,485	45	8	—	32	—	1	1	—	—	2	1	15
Carleton	23,507	123	16	4	79	3	1	1	1	11	7	—	89
Charlotte	23,285	129	13	3	66	32	—	2	—	5	8	—	133
Gloucester	66,343	282	29	7	129	84	—	4	1	5	20	3	405
Kent	26,667	27	8	2	14	1	—	—	—	1	1	—	19
Kings	25,908	136	27	8	71	6	—	1	—	6	17	—	70
Kings	38,983	221	23	6	116	41	1	2	—	8	23	1	340
Madawaska	50,035	262	14	3	164	64	—	3	—	7	7	—	191
Northumberland	11,640	13	4	—	8	—	—	—	—	1	—	—	—
Queens	40,973	265	36	6	148	27	3	2	1	6	36	—	958
Restigouche	89,251	945	118	29	533	70	27	7	4	29	120	8	2,776
St. John	22,796	23	2	1	17	—	—	—	—	1	2	—	26
Sunbury	19,712	87	11	4	52	—	—	1	—	5	14	—	108
Victoria	93,679	768	99	25	352	180	5	6	8	27	61	5	701
Westmorland	52,672	432	47	10	208	98	12	2	1	19	34	1	351
York													
Quebec													
Abitibi	108,313	281	42	11	133	51	—	7	4	8	25	—	901
Argenteuil	31,830	60	19	6	22	4	—	2	—	3	4	—	189
Arthabaska	45,301	226	26	10	74	91	1	2	3	2	17	—	531
Bagot	21,390	32	8	2	8	7	—	1	—	2	4	—	3
Beauce	62,264	197	42	10	53	58	—	2	3	6	22	1	202
Beauharnois	49,667	154	28	12	52	15	—	8	1	14	23	1	261
Bellechase	26,054	31	11	1	13	3	—	—	—	—	—	1	—
Berthier	27,325	34	12	3	15	2	—	2	—	2	—	—	148
Bonaventure	42,962	66	15	4	36	6	—	—	—	1	4	—	128
Brome	13,691	30	5	1	18	2	—	—	—	2	1	—	225
Brome	146,745	535	126	36	198	27	9	8	9	52	65	5	502
Chamblay	111,953	340	73	22	133	47	2	7	2	18	33	3	394
Champlain													
Charlevoix-est	16,450	38	11	3	16	4	—	—	—	2	1	1	53

SOURCE: See Table A227.

TABLE A246 (Continued)
**Number of Health Personnel, Hospital Beds, and Population in Canada, by
 County and Census Division, Canada, 1961**

	Popu- lation	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharma- cists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Chateauguay	34,042	95	19	3	49	3	—	—	1	8	12	—	80
Chicoutimi	157,196	1,005	165	23	400	238	7	7	5	38	115	7	1,166
Compton	24,410	40	10	1	20	5	—	—	—	—	3	1	—
Charlevoix-ouest	14,562	40	7	2	23	—	—	1	—	—	7	—	1,153
Deux-Montagnes	32,837	60	21	3	13	7	—	3	3	5	5	—	35
Dorchester	34,711	56	21	2	19	8	—	—	—	—	6	—	420
Drummond	58,220	261	34	11	67	106	—	3	3	14	18	5	204
Frontenac	30,600	52	14	5	22	4	—	—	1	—	3	1	104
Gaspé-Est	41,333	174	21	2	71	57	—	1	1	2	19	—	542
Gaspé-Ouest	20,529	47	12	2	25	3	—	—	—	—	4	—	24
Iles-de-la-Madel	12,479	20	4	—	13	2	—	—	—	1	1	—	110
Gatineau	44,308	126	30	7	51	12	—	1	2	4	19	—	85
Hull	84,803	405	59	20	154	84	1	5	1	22	59	—	520
Huntingdon	14,752	35	5	2	25	1	—	—	—	1	1	—	45
Iberville	18,080	43	10	3	22	1	—	—	1	5	14	—	26
Joliette	44,969	228	36	11	92	59	—	3	4	9	14	—	1,562
Kamouraska	27,138	54	12	3	22	9	—	1	1	1	5	—	78
Labelle	29,084	48	10	3	17	9	—	1	1	1	6	—	99
Lac-St. Jean Est	43,920	230	29	7	90	74	—	2	1	6	20	1	242
Lac-St. Jean Ouest	61,310	233	38	8	81	74	1	3	1	8	18	1	1,265
La Prairie	31,157	61	15	2	19	7	—	3	2	5	8	3	—
L'Assomption	39,440	82	22	5	29	6	—	3	2	7	7	1	13
Levis	51,842	301	50	11	130	44	3	1	1	19	41	1	272
L'Islet	24,798	42	13	1	18	3	—	—	—	3	4	—	30
Lotbinière	30,234	25	14	2	6	2	—	—	—	—	1	—	—
Makinsonge	21,274	61	12	1	23	13	1	1	—	3	7	—	80
Matane	35,078	87	13	3	32	28	—	3	—	3	5	—	135
Matapedia	35,586	41	10	3	14	6	—	1	—	3	4	—	45
Megantic	57,400	191	34	12	60	48	1	5	1	7	23	—	1,693

Missisquoi	29,526	103	18	7	44	14	—	3	2	6	9	—	122
Montcalm	18,766	25	6	3	10	2	—	—	—	2	2	—	21
Montmagny	26,540	113	13	3	36	41	—	2	1	5	12	—	167
Montmorency													
No. 1	20,734	54	9	1	24	4	—	—	1	3	12	—	53
Montmorency													
No. 2	4,974	9	5	—	1	2	—	—	—	—	1	—	—
Ile-de-Montreal	1,747,696	17,511	3,442	679	6,698	3,106	367	159	108	887	1,953	112	27,613
Ile-Jesus	124,741	462	101	35	139	20	9	15	6	71	52	14	65
Napierville	11,216	13	7	1	4	1	—	—	—	—	—	—	—
Nicolet	30,827	80	16	3	45	4	—	1	—	3	8	1	96
Papineau	32,697	73	14	5	33	5	—	—	2	6	7	—	131
Pontiac	19,947	61	10	3	46	—	—	—	—	—	2	—	57
Portneuf	50,711	69	27	4	28	—	—	2	1	2	3	—	25
Quebec	331,307	3,520	646	82	1,289	887	49	17	17	153	365	15	9,809
Richelieu	38,565	200	24	4	99	51	1	1	3	8	9	—	423
Richmond	42,232	127	21	6	52	28	—	2	—	6	12	—	86
Rimouski	65,295	300	48	9	90	114	—	2	1	6	30	—	935
Rouville	25,979	49	11	1	22	4	—	—	1	3	7	—	285
Saguenay	81,900	261	38	11	154	28	—	4	—	7	17	2	540
Shefford	54,963	160	34	8	56	29	—	6	4	9	12	2	159
Sherbrooke	80,490	930	108	27	348	326	2	8	9	29	67	6	1,023
Soulanges	10,075	19	3	1	8	3	—	—	—	—	4	—	54
Stanstead	36,095	113	23	9	56	12	—	2	1	4	6	—	132
St. Hyacinthe	44,993	312	45	13	105	88	2	6	4	14	33	2	639
St. Jean	38,470	207	27	13	67	51	4	6	3	13	22	1	185
St. Maurice	109,873	777	118	33	268	212	8	7	11	34	73	13	955
Temiscamisque	60,288	265	31	14	108	75	2	5	2	9	18	1	312
Rivière-du-Loup	40,239	136	21	8	42	50	1	1	1	5	8	—	104
Temiscouata	29,079	51	12	2	23	9	—	1	—	—	4	—	59
Terrebonne	102,275	379	78	22	166	33	3	7	6	20	43	1	803
Vaudreuil	28,681	120	18	9	55	5	—	1	3	12	17	—	—
Verchères	25,697	79	21	5	32	6	1	—	1	9	2	1	52
Wolfe	18,335	14	7	1	4	—	—	—	—	—	1	—	—
Yamaska	16,058	24	7	2	11	2	—	—	—	—	2	—	—
Ontario													
Algoma	111,408	644	72	32	321	119	6	5	7	38	42	2	540
Brant	83,839	818	92	27	411	166	13	6	8	35	59	1	865
Bruce	43,036	184	29	12	105	7	—	2	4	16	9	—	177
Carleton	352,932	3,613	627	135	1,628	622	68	20	12	148	336	17	3,085

SOURCE: See Table A227.

TABLE A246 (Continued)
**Number of Health Personnel, Hospital Beds, and Population in Canada, by
 County and Census Division, Canada, 1961**

	Popu- lation	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharma- cists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Cochrane	95,666	429	67	21	208	58	8	5	3	19	40	—	603
Dufferin	16,095	93	12	4	58	5	—	1	1	8	4	—	105
Dundas	17,162	84	12	9	48	3	—	1	—	5	6	—	86
Durham	39,912	199	25	11	126	3	8	2	3	9	12	—	99
Elgin	62,862	547	72	17	274	91	28	3	4	23	33	2	2,204
Essex	238,218	2,287	328	89	1,003	429	35	15	10	137	234	7	1,516
Frontenac	87,534	1,429	232	34	597	330	49	2	2	48	130	5	2,560
Glengarry	19,217	51	11	2	34	1	—	—	—	1	2	—	—
Grenville	22,864	117	16	6	67	6	1	1	—	10	10	—	40
Grey	62,005	376	52	18	197	44	4	7	6	25	22	1	331
Haldimand	28,197	105	17	6	54	6	2	1	3	10	6	—	56
Haliburton	8,928	24	4	1	15	—	1	—	—	3	—	—	17
Halton	106,967	746	125	42	407	24	14	11	11	48	61	3	282
Hastings	93,377	586	73	19	291	125	5	7	6	31	28	1	423
Huron	53,805	278	37	8	159	38	2	5	7	12	10	—	313
Kenora	51,474	258	35	9	170	3	1	2	1	8	29	—	344
Kent	89,427	661	83	22	314	130	6	10	10	34	50	2	521
Lambton	102,131	850	106	28	463	101	6	5	7	45	87	2	659
Lanark	40,313	332	40	14	214	3	10	5	4	9	32	1	2,350
Leeds	46,889	568	52	16	321	104	20	3	1	25	26	—	1,869
Lennox and Addington	23,717	71	13	5	33	3	2	1	3	5	5	1	—
Lincoln	126,674	1,103	167	55	522	186	17	6	12	57	79	2	846
Manitoulin	11,176	36	5	3	24	—	—	—	—	2	2	—	73
Middlesex	221,422	3,016	462	79	1,359	591	70	19	30	121	274	11	4,775

Muskoka	26,705	124	22	10	69	3	—	3	3	9	5	—	80
Nipissing	70,568	549	60	17	272	113	8	4	5	26	43	1	1,191
Norfolk	50,475	195	25	12	110	15	4	7	5	8	9	—	106
Northumberland	41,892	244	30	9	157	10	4	3	2	15	13	1	536
Ontario	135,895	994	128	40	533	141	23	11	10	50	56	2	2,002
Oxford	70,499	572	69	19	280	76	25	6	6	23	65	3	1,892
Parry Sound	29,632	144	20	5	90	5	1	1	1	7	14	—	217
Peel	111,575	624	131	43	293	18	11	9	15	47	54	3	202
Perth	57,452	375	51	17	182	55	2	6	8	27	26	1	363
Peterborough	76,375	769	87	33	369	161	7	2	9	35	66	—	551
Prescott	27,226	76	19	5	40	3	—	1	—	1	7	—	114
Prince Edward	21,108	80	18	4	41	2	—	2	2	5	6	—	55
Rainy River	26,531	119	16	6	70	1	—	3	1	11	11	—	157
Renfrew	89,635	511	47	16	321	41	2	8	4	19	52	1	486
Russell	20,892	20	8	1	7	1	—	—	—	1	2	—	—
Simcoe	141,271	938	124	50	497	127	6	8	14	47	63	2	3,575
Stormont	57,867	465	48	12	223	117	3	5	2	18	37	—	627
Sudbury	165,862	1,147	146	34	539	236	19	7	6	40	88	5	1,027
Thunder Bay	138,518	1,175	125	40	592	216	26	4	4	49	115	4	2,349
Timiskaming	50,971	279	40	11	157	25	1	6	3	12	24	—	405
Victoria	29,750	159	28	6	92	5	2	2	4	10	10	—	177
Waterloo	176,754	1,321	198	63	579	293	18	15	21	48	80	6	930
Welland	164,741	1,145	148	48	585	139	12	10	18	85	95	5	766
Wellington	84,702	835	92	33	411	166	13	4	9	35	69	3	870
Wentworth	358,837	3,245	465	142	1,464	595	75	19	25	195	256	9	3,907
York	1,733,108	17,007	3,029	899	7,180	1,798	490	123	163	1,226	1,993	106	13,852
Manitoba													
Division No. 1	28,734	49	12	—	22	1	1	—	1	3	9	—	76
Division No. 2	36,105	108	16	4	60	5	—	2	1	10	9	1	243
Division No. 3	21,980	92	14	2	54	6	1	1	—	6	7	1	348
Division No. 4	14,217	44	9	1	29	—	—	—	—	3	2	—	64
Division No. 5	31,402	182	15	4	93	42	9	1	—	5	11	2	1,101
Division No. 6	30,929	174	15	6	101	31	3	2	3	4	9	—	1,103
Division No. 7	49,536	496	41	15	264	76	21	7	5	20	46	1	1,613
Division No. 8	21,617	86	13	3	49	2	1	1	1	9	7	—	111

SOURCE: See Table A27.

TABLE A246 (Continued)
**Number of Health Personnel, Hospital Beds, and Population in Canada, by
 County and Census Division, Canada, 1961**

	Popu- lation	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharma- cists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Division No. 9	11,832	33	6	—	20	—	—	—	—	3	4	—	36
Division No. 10	19,296	73	14	4	36	5	—	2	1	6	5	—	94
Division No. 11	13,447	30	5	—	20	—	—	—	—	5	—	—	42
Division No. 12	28,686	62	10	1	41	—	—	—	—	5	4	1	94
Division No. 13	12,880	50	9	3	21	3	—	1	1	6	6	—	84
Division No. 14	6,702	8	2	—	3	—	—	—	—	2	1	—	32
Division No. 15	14,906	44	7	2	24	2	—	—	1	4	3	—	62
Division No. 16	46,781	234	28	5	158	4	3	2	1	11	22	—	507
Division No. 17	21,323	93	10	6	56	1	1	1	1	6	11	—	164
Division No. 18	15,403	10	1	—	8	—	—	—	—	1	—	—	17
Division No. 19	19,921	46	6	—	33	—	—	—	—	6	1	—	59
Division No. 20	475,989	5,475	881	195	1,933	1,115	112	33	28	352	793	27	4,212
Saskatchewan													
Division No. 1	38,875	148	22	5	85	4	—	1	—	17	14	—	203
Division No. 2	33,760	393	29	3	277	36	9	3	1	14	21	—	1,118
Division No. 3	28,245	107	17	6	59	3	—	1	1	9	11	—	175
Division No. 4	17,925	85	14	3	47	5	1	—	—	7	8	—	116
Division No. 5	45,396	172	21	6	107	6	—	2	1	14	15	—	235
Division No. 6	154,400	1,871	257	48	672	472	33	16	8	98	257	10	1,928
Division No. 7	61,340	765	50	14	368	204	14	5	3	28	78	1	1,597
Division No. 8	41,328	267	30	14	155	14	2	4	1	19	28	—	305
Division No. 9	50,021	287	31	9	130	64	2	4	3	19	23	2	325
Division No. 10	33,977	114	15	2	65	7	2	1	—	11	11	—	171
Division No. 11	125,846	1,920	293	36	648	486	43	17	6	99	280	12	1,408

Division No. 12	28,283	131	12	6	77	9	4	1	—	10	12	—	109
Division No. 13	32,994	143	18	5	84	11	1	2	2	11	9	—	167
Division No. 14	54,564	236	31	9	132	25	3	3	3	11	18	1	505
Division No. 15	83,669	602	54	17	247	167	7	2	5	30	66	1	828
Division No. 16	45,020	498	39	13	359	32	6	2	1	18	28	—	1,436
Division No. 17	28,830	128	12	3	82	8	5	1	1	6	9	1	209
Division No. 18	20,708	51	6	—	38	3	—	—	—	1	3	—	121
Alberta													
Division No. 1	39,140	275	31	9	130	58	2	3	4	17	21	—	263
Division No. 2	83,306	805	89	22	347	191	12	6	10	42	84	2	795
Division No. 3	30,967	146	22	7	91	5	1	1	1	8	10	—	383
Division No. 4	15,020	52	8	2	29	2	—	1	1	4	5	—	124
Division No. 5	38,115	138	21	8	81	5	2	1	2	9	8	1	253
Division No. 6	317,989	2,758	359	130	1,246	445	59	29	37	170	266	17	2,388
Division No. 7	40,837	185	29	9	95	4	—	1	5	18	24	—	321
Division No. 8	76,533	717	57	21	422	105	28	6	5	28	37	8	3,487
Division No. 9	20,274	92	10	5	54	6	1	1	1	8	6	—	156
Division No. 10	70,177	420	48	11	198	80	9	5	6	32	30	1	597
Division No. 11	410,679	4,372	609	173	1,865	666	132	41	45	276	538	27	11,311
Division No. 12	47,310	127	20	3	79	3	—	1	1	7	13	—	312
Division No. 13	45,431	126	16	6	73	1	1	2	2	9	16	—	257
Division No. 14	19,282	57	9	2	30	2	—	—	1	8	4	1	64
Division No. 15	76,884	270	28	20	164	11	5	3	4	12	23	—	501
British Columbia													
Division No. 1	32,244	162	25	6	105	4	—	2	1	10	8	1	223
Division No. 2	70,707	426	59	21	258	14	5	6	5	20	37	1	429
Division No. 3	94,646	595	82	32	330	23	18	10	11	36	51	2	800
Division No. 4	907,531	9,784	1,476	416	4,458	1,409	281	81	87	586	902	88	11,575
Division No. 5	290,835	2,647	350	110	1,285	429	62	21	21	131	223	15	2,308
Division No. 6	66,290	403	53	16	200	68	5	4	3	20	32	2	653
Division No. 7	21,325	124	16	5	76	9	1	1	1	4	10	1	185
Division No. 8	74,240	327	47	14	199	1	5	3	4	22	32	—	417
Division No. 9	38,203	247	26	10	170	4	2	2	—	12	21	—	723
Division No. 10	31,061	96	16	7	49	2	2	1	1	8	10	—	149

SOURCE: See Table A227.

TABLE A247
Numbers of Health Personnel per 10,000 Population and Hospital Beds per 10,000
Population, by County and Census Division, Canada, 1961

	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharma- cists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Newfoundland												
Division No. 1	81.47	7.36	1.38	31.45	28.37	1.48	0.21	0.05	3.18	7.70	0.21	110.16
Division No. 2	12.51	2.42	0.40	6.46	1.21	—	—	—	0.40	1.61	—	24.21
Division No. 3	11.59	3.86	—	4.72	0.43	—	—	—	0.43	2.15	—	23.18
Division No. 4	12.82	3.31	0.83	5.79	0.83	—	—	—	0.83	1.24	—	27.29
Division No. 5	32.75	5.12	1.28	17.14	2.30	0.77	—	—	1.79	4.09	0.26	96.45
Division No. 6	19.45	4.47	1.28	9.99	1.84	—	—	—	0.79	1.58	—	26.02
Division No. 7	6.05	2.02	0.50	1.77	0.76	—	—	—	—	1.01	—	10.84
Division No. 8	6.94	2.46	0.45	2.01	0.67	—	—	—	0.22	1.12	—	23.96
Division No. 9	10.59	2.30	—	5.99	—	—	—	—	—	2.30	—	64.95
Division No. 10	18.47	5.17	0.74	10.34	2.22	—	—	—	—	—	—	22.91
Prince Edward Island												
Kings	26.27	3.91	1.12	13.41	3.35	—	—	—	1.68	2.79	—	29.62
Prince	51.60	6.85	2.20	21.03	14.43	0.24	—	0.24	3.18	3.18	0.24	55.27
Queens	101.00	12.22	3.05	46.46	24.21	2.62	0.65	0.22	3.49	7.20	0.87	121.72
Nova Scotia												
Annapolis	34.44	5.30	1.77	18.10	0.88	—	0.44	0.88	3.97	3.09	—	60.93
Antigonish	149.03	8.36	2.79	53.62	64.76	0.70	—	0.70	3.48	5.03	—	139.28
Cape Breton	85.47	6.77	2.21	42.43	23.12	0.53	0.46	0.15	2.05	7.38	0.38	123.19
Colchester	59.17	6.41	3.21	34.69	1.75	—	1.17	—	4.08	4.37	3.50	83.66
Cumberland	46.34	6.62	2.38	30.19	1.32	—	0.79	—	1.32	3.71	—	83.94
Digby	26.71	7.91	1.98	12.37	—	—	0.49	—	1.48	2.47	—	13.85
Guysborough	18.83	4.52	—	11.30	0.75	—	0.75	—	—	1.51	—	91.91
Halifax	112.70	15.64	3.01	47.67	26.80	2.13	0.44	0.22	3.99	12.45	0.35	134.01
Hants	48.40	5.67	0.76	24.96	10.97	0.38	0.38	—	1.89	3.40	—	27.98
Inverness	41.14	4.81	2.14	25.11	3.74	—	0.53	—	0.53	4.27	—	56.10
Kings	56.77	10.78	1.92	31.62	1.68	0.24	0.72	0.72	3.11	14.62	0.96	129.59
Lunenburg	37.72	6.86	2.29	17.43	4.00	—	0.57	0.86	2.86	2.57	0.29	22.00
Pictou	87.91	6.83	2.28	39.40	28.70	0.46	0.68	0.23	3.19	5.01	1.14	89.28
Queens	35.72	6.08	2.28	20.53	—	—	0.76	0.76	2.28	3.04	—	23.57

Richmond	18.46	5.28	—	7.03	2.64	—	—	—	—	3.52	—	12.31
Shelburne	24.99	5.92	1.32	15.12	—	—	—	—	—	2.63	—	26.30
Victoria	32.66	3.63	—	24.20	2.42	—	—	—	—	2.42	—	59.28
Yarmouth	57.30	9.41	2.14	27.79	10.26	—	0.86	0.43	2.14	3.85	0.43	69.70
New Brunswick												
Albert	36.04	6.41	—	25.63	—	0.80	0.80	—	—	1.60	0.80	12.01
Carleton	52.33	6.81	1.70	33.61	1.28	0.43	0.43	0.43	4.68	2.98	—	37.86
Charlotte	55.40	5.58	1.29	28.34	13.74	—	0.86	—	2.15	3.44	—	57.12
Gloucester	42.51	4.37	1.06	19.44	12.66	—	0.60	0.15	0.75	3.01	0.45	61.05
Kent	10.13	3.00	0.75	5.25	0.38	—	—	—	0.38	0.38	—	7.12
Kings	52.49	10.42	3.09	27.41	2.32	—	0.39	—	2.32	6.56	—	27.02
Madawaska	56.69	5.90	1.54	29.76	10.52	0.26	0.51	—	2.05	5.90	0.26	87.22
Northumberland	52.36	2.80	0.60	32.78	12.79	—	0.60	—	1.40	1.40	—	38.17
Queens	11.17	3.44	—	6.87	—	—	—	—	0.86	—	—	—
Restigouche	64.68	8.79	1.46	36.12	6.59	0.73	0.49	0.24	1.46	8.79	—	23.81
Saint John	105.88	13.22	3.25	59.72	7.84	3.03	0.78	0.45	3.25	13.45	0.90	311.03
Sunbury	10.09	0.88	0.44	7.46	—	—	—	—	0.44	0.88	—	11.41
Victoria	44.14	5.58	2.03	26.38	—	—	0.51	—	2.54	7.10	—	54.79
Westmorland	81.98	10.57	2.67	37.58	19.22	0.53	0.64	0.85	2.88	6.51	0.53	74.83
York	82.02	8.92	1.90	39.49	18.61	2.28	0.38	0.19	3.61	6.46	0.19	66.64
Quebec												
Abitibi	25.94	3.88	1.02	12.28	4.71	—	0.65	0.37	0.74	2.31	—	83.16
Argenteuil	18.85	5.97	1.88	6.91	1.26	—	0.63	—	0.94	1.26	—	59.36
Arthabaska	49.88	5.74	2.21	16.33	20.88	0.22	0.44	0.66	0.44	3.75	—	117.19
Bagot	14.96	3.74	0.94	3.74	3.27	—	0.47	—	0.94	1.87	—	1.40
Beauce	31.64	6.75	1.61	8.51	9.31	—	0.32	0.48	0.96	3.53	0.16	32.44
Beauharnois	31.00	5.64	2.42	10.47	3.02	—	1.61	0.20	2.82	4.63	0.20	52.54
Bellechase	11.90	4.22	0.38	5.76	1.15	—	—	—	—	—	0.38	—
Berthier	12.44	4.39	1.10	4.76	0.73	—	0.73	—	0.73	—	—	54.15
Bonaventure	15.36	3.49	0.93	8.38	1.39	—	—	—	0.23	0.93	—	29.79
Brome	21.91	3.65	0.73	13.15	1.46	0.73	—	—	1.46	0.73	—	164.34
Chamby	36.43	8.58	2.45	13.48	1.83	0.61	0.54	0.61	3.54	4.43	0.34	34.19
Champlain	30.36	6.52	1.96	11.88	4.20	0.18	0.63	0.18	1.61	2.95	0.27	35.18
Charlevoix-est	23.10	6.69	1.82	9.73	2.43	—	—	—	1.22	0.61	0.61	32.22
Charlevoix-ouest	27.47	4.81	1.37	15.79	—	—	0.69	—	—	4.81	—	791.77
Chateauguy	27.90	5.58	0.88	14.39	0.88	—	—	0.29	2.35	3.52	—	23.50
Chicoutimi	63.92	10.49	1.46	25.44	15.14	0.45	0.45	0.32	2.42	7.31	0.45	74.16
Compton	16.38	4.10	0.41	8.20	2.05	—	—	—	—	1.23	0.41	—
Deux-Montagnes	18.27	6.39	0.91	3.96	2.13	—	0.91	0.91	2.44	2.44	—	10.66
Dorchester	16.13	6.05	0.58	5.47	2.30	—	—	—	—	1.73	—	120.96

SOURCE: See Table A.227.

TABLE A247 (Continued)
Numbers of Health Personnel per 10,000 Population and Hospital Beds per 10,000 Population, by County and Census Division, Canada, 1961

	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharmacists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Drummond	44.81	5.84	1.89	11.50	18.20	—	0.52	0.52	2.40	3.09	0.86	35.03
Frontenac	16.99	4.57	1.63	7.19	1.31	—	0.65	0.33	—	0.98	0.33	33.98
Gaspé-Est	42.09	5.08	0.48	17.17	13.79	—	0.24	0.24	0.48	4.60	—	131.11
Gaspé-Ouest	22.89	5.58	0.97	12.18	1.46	—	—	—	0.49	1.95	—	11.69
Iles-de-la-Madeleine	16.03	3.21	—	10.42	1.60	—	—	—	—	0.80	—	88.14
Gatineau	28.43	6.77	1.58	13.08	2.71	—	0.23	0.45	0.90	4.29	—	19.18
Hull	47.75	6.96	2.36	18.16	9.90	0.12	0.59	0.12	2.59	6.96	—	61.31
Huntingdon	23.72	3.39	1.36	16.95	1.36	—	—	—	0.68	—	—	30.50
Iberville	23.78	5.53	1.66	12.17	0.55	—	—	0.55	2.77	0.55	—	14.38
Joliette	50.68	8.00	2.45	20.45	13.12	—	0.67	0.89	2.00	3.11	—	347.23
Kamouraska	19.89	4.42	1.11	8.10	3.32	—	0.37	0.37	0.37	1.84	—	28.74
LaBelle	16.50	3.44	1.03	5.84	3.09	—	0.34	0.34	0.34	2.06	—	34.04
Lac-St. Jean Est	52.35	5.89	1.59	20.48	16.84	—	0.46	0.23	1.37	4.55	0.23	55.08
Lac-St. Jean Ouest	38.00	6.20	1.30	13.21	12.07	0.16	0.49	0.16	1.30	2.94	0.16	206.32
La Prairie	19.57	4.81	0.64	6.10	2.25	—	0.64	0.64	1.60	2.57	0.96	—
L'Assomption	20.79	5.58	1.27	7.35	1.52	—	0.76	0.51	1.77	1.77	0.25	3.30
Levis	58.03	9.64	2.12	25.06	8.48	0.58	0.19	0.19	3.66	7.90	0.19	52.44
L'Islet	16.93	5.24	0.40	7.26	1.21	—	—	—	1.21	1.61	—	12.10
Lotbinière	8.27	4.63	0.66	1.98	0.66	—	—	—	—	0.33	—	—
Maknouché	28.67	5.64	0.47	16.45	6.11	0.47	0.47	—	1.41	3.29	—	37.60
Matane	24.80	3.71	0.86	9.12	7.98	—	0.86	—	0.86	1.43	—	38.48
Matapédia	11.52	2.81	0.84	3.93	1.69	—	0.28	—	0.84	1.12	—	12.65
Mégantic	33.27	5.92	2.09	10.45	8.36	0.17	0.87	0.17	1.22	4.01	—	294.92
Missisquoi	34.88	6.09	2.37	14.90	4.74	—	1.02	0.68	2.03	3.05	—	41.31
Montcalm	13.32	3.20	1.60	5.33	1.07	—	—	—	1.07	1.07	—	11.19
Montmagny	42.71	4.91	1.13	13.61	15.50	—	0.76	0.38	1.89	4.54	—	63.13
Montmorency No. 1	26.04	4.34	0.48	11.57	1.93	—	—	0.48	1.45	5.79	—	25.56
Montmorency No. 2	18.09	10.05	—	2.01	4.02	—	—	—	—	2.01	—	—
Ile-de-Montreal	87.56	17.21	3.40	33.49	15.53	1.84	0.80	0.54	4.44	9.77	0.56	138.07
Ile-Jesus	37.01	8.09	2.80	11.13	1.60	0.72	1.20	0.48	5.69	4.17	1.12	5.21
Napierville	11.59	6.24	0.89	3.57	0.89	—	—	—	—	—	—	—
Nicolet	25.94	5.18	0.97	14.59	1.30	—	0.32	—	0.97	2.59	—	31.13

Papineau	22.32	4.28	1.53	10.09	1.53	—	—	0.61	1.83	2.14	0.31	40.06
Pontiac	30.58	5.01	1.50	23.06	—	—	—	—	—	1.00	—	28.57
Portneuf	13.60	5.32	0.79	5.52	0.39	0.39	0.39	0.20	0.39	1.00	—	4.93
Quebec	105.95	19.44	2.47	38.80	26.70	1.47	0.51	0.51	4.61	10.99	0.45	295.25
Richelieu	51.86	6.22	1.04	25.67	13.22	0.26	0.26	0.78	2.07	2.33	—	109.68
Richmond	30.06	4.97	1.42	12.31	6.63	—	0.47	—	—	2.84	—	20.36
Rimouski	45.93	7.35	1.37	13.78	17.45	—	0.31	0.15	0.92	4.59	—	143.15
Rouville	18.86	4.23	0.38	8.47	1.54	—	—	0.38	1.15	2.69	—	109.70
Saguenay	31.87	4.64	1.34	18.80	3.42	—	0.49	—	—	2.08	0.24	65.93
Shedford	29.10	6.18	1.46	10.19	5.28	—	1.09	0.73	1.64	2.18	0.36	28.92
Sherbrooke	115.51	13.41	3.35	43.22	40.49	0.25	0.99	1.12	3.60	8.32	0.75	127.06
Soulanges	18.86	2.98	0.99	7.94	2.98	—	—	—	—	3.97	—	53.60
Stanstead	31.30	6.37	2.49	15.51	3.32	—	0.55	0.28	1.11	1.66	—	36.56
St. Hyacinthe	69.33	10.00	2.89	23.33	19.55	0.44	1.33	0.89	3.11	7.33	0.44	141.99
St. Jean	53.80	7.02	3.38	17.41	13.25	1.04	1.56	0.72	3.08	5.72	0.26	48.08
St. Maurice	70.71	10.74	3.00	24.39	19.29	0.73	0.64	1.00	3.09	6.64	0.18	86.91
Temiscamingue	43.94	5.14	2.32	17.91	12.44	0.33	0.83	0.33	1.49	2.98	0.16	51.73
Riviere-du-Loup	33.80	5.22	1.99	10.44	12.43	0.25	0.34	0.25	1.24	1.99	—	25.84
Temiscouata	17.53	4.13	0.68	7.91	3.09	—	—	—	—	1.38	—	20.28
Terrebonne	37.03	7.62	2.15	16.22	3.22	0.29	0.68	0.59	1.95	4.20	0.10	78.45
Vaudreuil	41.83	6.27	3.14	19.17	1.74	—	0.35	1.05	4.18	5.93	—	—
Wolfe	7.64	3.82	0.55	2.18	0.55	—	—	—	—	0.55	—	—
Verchères	30.74	8.17	1.95	12.45	2.33	0.39	0.39	0.39	3.50	0.78	0.39	20.23
Yamaska	14.94	4.36	1.25	6.85	1.25	—	—	—	—	1.25	—	—
Ontario												
Algoma	57.77	6.46	2.87	28.79	10.67	0.54	0.45	0.63	3.41	3.77	0.18	48.44
Brant	97.51	10.97	3.22	48.99	19.79	1.55	0.72	0.95	4.17	7.03	0.12	103.11
Bruce	42.74	6.74	2.79	24.39	1.63	—	0.46	0.93	3.72	2.09	—	41.12
Carleton	102.25	17.74	3.82	46.07	17.60	1.92	0.57	0.34	4.19	9.51	0.48	87.31
Cochrane	44.83	7.00	2.19	21.74	6.06	0.84	0.52	0.31	1.99	4.18	—	63.01
Dufferin	57.78	7.46	2.49	36.04	3.11	—	0.62	0.62	4.97	2.49	—	65.24
Dundas	48.94	6.99	5.24	27.96	1.75	—	0.58	—	2.91	3.50	—	50.10
Durham	49.85	6.26	2.76	31.56	0.75	2.00	0.50	0.75	2.25	3.01	—	24.80
Elgin	86.97	11.45	2.70	43.57	14.47	4.45	0.47	0.64	3.66	5.25	0.32	350.44
Essex	88.51	12.69	3.44	38.82	16.60	1.35	0.58	0.39	5.30	9.06	0.27	58.67
Frontenac	163.19	26.49	3.88	68.18	37.69	5.60	0.23	0.23	5.48	14.85	0.57	292.35
Glengarry	26.54	5.72	1.04	17.69	0.52	—	—	—	0.52	1.04	—	—
Grenville	51.16	7.00	2.62	29.30	2.62	0.44	0.44	—	4.37	4.37	—	17.49
Grey	60.61	8.38	2.90	31.76	7.09	0.64	1.13	0.97	4.03	3.55	0.16	53.36
Haldimand	37.23	6.03	2.13	19.15	2.13	0.71	0.35	1.06	3.55	2.13	—	19.86
Haliburton	26.88	4.48	1.12	16.80	—	1.12	—	—	3.36	—	—	19.04

SOURCE: See Table A227.

TABLE A247 (Continued)
Numbers of Health Personnel per 10,000 Population and Hospital Beds per 10,000 Population, by County and Census Division, Canada, 1961

	Total health pros.	Phys. surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharmacists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Halton	69.68	11.68	3.92	38.01	2.24	1.31	1.04	1.04	4.48	5.70	0.28	26.34
Hastings	62.70	7.81	2.03	31.14	13.38	0.54	0.75	0.64	3.32	3.00	0.11	45.26
Huron	51.65	6.87	1.49	29.54	7.06	0.37	0.93	1.30	2.23	1.86	—	58.16
Kenora	50.10	6.80	1.75	33.01	0.58	0.19	0.39	0.19	1.55	5.63	—	66.80
Kent	73.90	9.28	2.46	35.11	14.53	0.67	1.12	1.12	3.80	5.59	0.22	58.25
Lambton	83.22	10.38	2.74	45.33	9.89	0.59	0.49	0.69	4.41	8.52	0.20	64.52
Lanark	82.34	9.92	3.47	53.07	0.74	24.80	12.40	0.99	2.23	7.94	0.25	582.80
Leeds	121.10	11.09	3.41	68.44	22.17	4.26	0.64	0.21	5.33	5.54	—	398.47
Lennox and Addington	29.93	5.48	2.11	13.91	1.26	0.84	0.42	1.26	2.11	2.11	0.42	—
Lincoln	87.03	13.18	4.34	41.19	14.68	1.34	0.47	0.95	4.50	6.23	0.16	66.75
Manitoulin	32.21	4.47	2.68	21.47	—	—	—	—	1.79	1.79	—	65.31
Middlesex	136.02	20.84	3.56	61.29	26.65	3.16	0.86	1.35	5.46	12.36	0.50	215.35
Muskoka	46.43	8.24	3.74	25.83	1.12	—	1.12	1.12	3.37	1.87	—	29.95
Nipissing	77.79	8.50	2.41	38.55	16.01	1.13	0.57	0.71	3.68	6.09	0.14	168.76
Norfolk	38.63	4.95	2.38	21.79	2.97	0.79	1.39	0.99	1.58	1.78	—	21.00
Northumberland	58.24	7.16	2.15	37.48	2.39	0.95	0.72	0.48	3.58	3.10	0.24	127.94
Ontario	73.06	9.41	2.94	39.18	10.36	1.69	0.81	0.74	3.68	4.12	0.15	147.15
Oxford	81.11	9.79	2.69	39.70	10.78	3.55	0.85	0.85	3.26	9.22	0.43	268.29
Parry Sound	48.59	6.75	1.69	30.37	1.69	0.34	0.34	0.34	2.36	4.72	—	73.22
Peel	55.91	11.74	3.85	26.25	1.61	0.99	0.81	1.35	4.21	4.84	0.27	18.10
Perth	65.25	8.87	2.96	31.67	9.57	0.35	1.04	1.39	4.70	4.52	0.17	63.16
Peterborough	100.66	11.39	4.32	48.30	21.07	0.92	0.26	1.18	4.58	8.64	—	72.13
Prescott	27.91	6.98	1.84	14.69	1.10	—	0.37	—	0.37	2.58	—	41.86
Prince Edward	37.90	8.53	1.89	19.42	0.95	—	0.95	0.95	2.37	2.84	—	26.05
Rainy River	44.85	6.03	2.26	26.38	0.38	—	1.13	0.38	4.15	4.15	—	59.17
Renfrew	56.98	5.24	1.78	35.79	4.57	0.22	0.89	0.45	2.12	5.80	0.11	54.19
Russell	9.57	3.83	0.48	3.35	0.48	—	—	—	0.48	0.96	—	—
Simcoe	66.32	8.77	3.54	35.14	8.98	—	0.57	0.99	3.32	4.45	0.14	252.75
Stormont	80.35	8.29	2.07	38.53	20.22	0.52	0.86	0.35	3.11	6.39	—	108.35
Sudbury	69.05	8.79	2.05	32.45	15.83	1.14	0.42	0.36	2.41	5.30	0.30	61.83
Thunder Bay	84.72	9.01	2.88	42.68	15.57	1.87	0.29	0.29	3.53	8.29	0.29	169.36
Timiskaming	54.71	7.84	2.16	30.79	4.90	0.20	1.18	0.59	2.35	4.71	—	79.42
Victoria	53.44	9.41	2.02	30.92	1.68	0.67	0.67	1.34	3.36	3.36	—	59.49
Waterloo	74.64	11.19	3.56	32.71	16.55	1.02	0.85	1.19	2.71	4.52	0.34	52.55

Welland	69.50	8.98	2.91	35.51	8.43	0.73	0.61	1.09	5.16	5.77	0.30	46.50
Wellington	98.53	10.86	3.89	48.50	19.59	1.53	0.47	1.06	4.13	8.14	0.35	102.66
Wentworth	90.21	12.93	3.95	40.70	16.54	2.09	0.53	0.70	5.42	7.12	0.25	108.61
York	85.04	15.15	4.50	35.90	8.99	2.45	0.62	0.82	6.13	9.97	0.53	69.26
Manitoba												
Division No. 1	17.05	4.18	—	7.66	0.35	0.35	—	0.35	1.04	3.13	—	26.45
Division No. 2	29.91	4.43	1.11	16.61	1.38	—	0.55	0.28	2.77	2.49	0.28	67.29
Division No. 3	41.85	6.37	0.91	24.56	2.73	0.45	0.45	—	2.73	3.18	0.45	158.31
Division No. 4	30.95	6.33	0.70	20.40	—	—	—	—	2.11	1.41	—	45.01
Division No. 5	37.95	4.78	1.27	29.61	13.37	2.87	0.32	—	1.59	3.50	0.64	350.56
Division No. 6	56.25	4.85	1.94	32.65	10.02	0.97	0.65	0.97	1.29	2.91	—	356.60
Division No. 7	100.09	8.27	3.03	53.28	15.34	4.24	1.41	1.01	4.04	9.28	0.20	325.50
Division No. 8	39.78	6.01	1.39	22.66	0.93	0.46	0.46	0.46	4.16	3.24	—	51.34
Division No. 9	27.89	5.07	—	16.90	—	—	—	—	2.54	3.38	—	30.42
Division No. 10	37.83	7.25	2.07	18.66	2.59	—	1.04	0.52	3.11	2.59	—	48.71
Division No. 11	22.31	3.72	—	14.87	—	—	—	—	3.72	—	—	31.23
Division No. 12	21.61	3.49	0.35	14.29	—	—	—	—	1.74	1.39	0.35	32.77
Division No. 13	38.82	6.99	2.33	16.30	2.33	—	0.78	0.78	4.66	4.66	—	65.21
Division No. 14	11.94	2.98	—	4.48	—	—	—	—	2.98	1.49	—	47.74
Division No. 15	29.52	4.70	1.34	16.10	1.34	—	0.67	0.67	2.68	2.01	—	41.59
Division No. 16	50.00	5.98	1.07	33.76	0.85	0.64	0.43	0.21	2.35	4.70	—	108.35
Division No. 17	43.61	4.69	2.81	26.26	0.47	0.47	0.47	0.47	2.81	5.16	—	76.90
Division No. 18	6.49	0.64	—	5.19	—	—	—	—	0.64	—	—	11.04
Division No. 19	23.09	3.01	—	16.56	—	—	—	—	3.01	0.50	—	29.61
Division No. 20	114.98	18.63	4.10	40.59	23.42	2.35	0.69	0.59	7.39	16.65	0.57	88.45
Saskatchewan												
Division No. 1	38.07	5.66	1.29	21.86	1.03	—	0.26	—	4.37	3.60	—	52.21
Division No. 2	116.41	8.59	0.89	82.05	10.66	2.67	0.89	0.30	4.15	6.22	—	331.15
Division No. 3	37.88	6.02	2.12	20.89	1.06	—	0.35	0.35	1.06	3.89	—	61.95
Division No. 4	47.41	7.81	1.67	26.22	2.79	0.56	—	—	3.90	4.46	—	64.70
Division No. 5	37.87	4.62	1.32	23.56	1.32	—	0.44	0.22	3.08	3.30	—	51.75
Division No. 6	121.05	16.63	3.11	43.48	30.54	2.14	1.04	0.52	6.34	16.63	0.65	124.74
Division No. 7	124.70	8.15	2.28	59.98	33.24	2.28	0.82	0.49	4.56	12.71	0.16	260.31
Division No. 8	64.59	7.26	3.39	37.49	3.39	0.48	0.97	0.24	4.60	6.77	—	73.78
Division No. 9	57.37	6.20	1.80	25.99	12.79	0.40	0.80	0.60	3.80	4.60	0.40	64.97
Division No. 10	33.55	4.41	0.59	19.13	2.06	0.59	0.29	—	3.24	3.24	—	50.33
Division No. 11	152.45	23.26	2.86	51.45	38.59	3.41	1.35	0.48	7.86	22.23	0.95	111.80
Division No. 12	46.31	4.24	2.12	27.22	3.18	1.41	0.35	—	3.54	4.24	—	38.53
Division No. 13	43.33	5.45	1.52	25.45	3.33	0.30	0.61	0.61	3.33	2.73	—	50.60
Division No. 14	43.24	5.68	1.65	24.18	4.58	0.55	0.55	0.55	2.02	3.30	0.18	92.52
Division No. 15	71.94	6.45	2.03	29.52	19.96	0.84	0.96	0.60	3.59	7.89	0.12	98.95

SOURCE: See Table A227.

TABLE A247 (Continued)
Numbers of Health Personnel per 10,000 Population and Hospital Beds per 10,000 Population, by County and Census Division, Canada, 1961

	Total health pros.	Phys. and surg.	Dentists	Grad. nurses	Nurses in training	Phys. and occup. therapists	Opt.	Osteo. and chiro.	Pharmacists	Medical, dental, x-ray techs.	Other health pros.	Hosp. beds
Division No. 16	110.61	8.66	2.89	79.73	7.11	1.33	0.44	0.22	4.00	6.22	—	318.94
Division No. 17	44.39	4.16	1.04	28.44	2.77	1.73	0.35	0.35	2.08	3.12	0.35	72.48
Division No. 18	24.63	2.90	—	18.35	1.45	—	—	—	0.48	1.45	—	58.43
Alberta												
Division No. 1	70.26	7.92	2.30	33.21	14.82	0.51	0.77	1.02	4.34	5.37	—	67.20
Division No. 2	96.63	10.68	2.64	41.65	22.93	1.44	0.72	1.20	5.04	10.08	0.24	95.43
Division No. 3	47.15	7.10	2.26	29.39	1.61	0.32	0.32	0.32	2.58	3.23	—	123.68
Division No. 4	34.62	5.33	1.33	19.31	1.33	—	0.67	0.67	2.66	3.33	—	82.56
Division No. 5	36.21	5.51	2.10	21.25	1.31	0.52	0.26	0.52	2.36	2.10	0.26	66.38
Division No. 6	86.73	11.29	4.09	39.18	13.99	1.86	0.91	1.16	5.35	8.37	0.53	75.10
Division No. 7	45.30	7.10	2.20	23.26	0.98	—	0.24	1.22	4.41	5.88	—	78.61
Division No. 8	93.69	7.45	2.74	55.14	13.72	3.66	0.78	0.65	3.66	4.83	1.05	455.62
Division No. 9	45.83	4.93	2.47	26.64	2.96	0.49	0.49	0.49	3.95	2.96	—	76.95
Division No. 10	59.85	6.84	1.57	28.21	11.40	1.28	0.71	0.85	4.56	4.27	0.14	85.07
Division No. 11	106.46	14.83	4.21	45.41	16.22	3.21	1.00	1.10	6.72	13.10	0.66	275.42
Division No. 12	26.84	4.23	0.63	16.70	0.63	—	0.21	0.21	1.48	2.75	—	65.95
Division No. 13	27.73	3.52	1.32	16.07	0.22	0.22	0.44	0.44	1.98	3.52	—	56.57
Division No. 14	29.56	4.67	1.04	15.56	1.04	—	—	0.52	4.15	2.07	0.52	33.19
Division No. 15	35.12	3.64	2.60	21.33	1.43	0.65	0.39	0.52	1.56	2.99	—	65.16
British Columbia												
Division No. 1	50.24	7.75	1.86	32.56	1.24	—	0.62	0.31	3.10	2.48	0.31	69.15
Division No. 2	60.24	8.34	2.97	36.48	1.98	0.71	0.85	0.71	2.83	5.23	0.14	60.66
Division No. 3	62.83	8.66	3.38	34.85	2.43	1.90	1.06	1.16	3.80	5.39	0.21	84.48
Division No. 4	107.62	16.24	4.58	49.04	15.50	3.09	0.89	0.96	6.45	9.92	0.97	127.33
Division No. 5	90.79	12.01	3.77	44.08	14.71	2.13	0.72	0.72	4.49	7.65	0.51	79.16
Division No. 6	60.77	7.99	2.41	30.16	10.25	0.75	0.60	0.45	3.02	4.83	0.30	98.47
Division No. 7	58.14	7.50	3.24	35.63	4.22	0.47	0.47	0.47	1.88	4.69	0.47	86.75
Division No. 8	44.01	6.33	1.88	26.79	0.13	0.67	0.40	0.54	2.96	4.31	—	56.13
Division No. 9	64.64	6.80	2.62	44.49	1.05	0.52	0.52	—	3.14	5.50	—	189.21
Division No. 10	30.90	5.15	2.25	15.77	0.64	0.64	0.32	0.32	2.58	3.22	—	47.96

SOURCE: See Table A227.

TABLE A248
Distribution of Physicians, Dentists, Pharmacies and Hospitals, by Major Cities,
Ontario, February 1969

Major cities	Physicians	% of Ontario	Dentists	% of Ontario	Pharmacies	% of Ontario	Hospitals & nursing institutions	% of Ontario	Population (000's)	% of Ontario
Toronto	3,289	38.7	1,204	42.0	586	34.8	122	17.6	2,159	30.0
Hamilton	615	7.2	206	7.2	97	5.8	25	4.0	449	6.2
Kitchener	216	2.5	84	2.9	48	2.9	22	3.2	192	2.6
London	409	4.8	114	4.0	57	3.4	21	3.0	207	2.8
Ottawa ¹	613	7.2	197	6.9	78	4.6	28	4.0	384	5.2
Sudbury	136	1.6	30	1.0	23	1.4	7	1.0	117	1.6
Windsor	285	3.4	70	2.4	54	3.2	12	2.0	212	2.9
Brampton	64	.6	17	.6	10	.5	4	.6	45	.6
Brantford	78	.9	26	1.0	19	1.1	7	1.0	62	.9
Fort William										
Port Arthur	124	1.5	44	1.5	22	1.3	11	1.6	98	1.3
Kingston	220	2.6	40	1.4	21	1.3	10	1.4	72	1.0
Niagara Falls	67	.8	24	.8	23	1.4	6	.9	61	.8
Oshawa	135	1.6	34	1.2	23	1.4	8	1.2	100	1.4
St. Catharines	161	1.9	47	1.6	25	1.5	10	1.4	109	1.5
Sarnia	98	1.2	26	.9	15	.9	4	.6	67	.9
Timmins	32	.4	9	.3	7	.4	4	.6	40	.6
Welland	68	.8	13	.4	17	1.0	5	.7	59	.8
Guelph	74	.9	24	.8	18	1.1	10	1.4	51	.7
Peterborough	98	1.2	33	1.2	13	.8	7	1.0	56	.8
Sault Ste. Marie	68	.8	29	1.0	17	1.0	3	.4	75	1.0
Total in major cities	6,850	81.0	2,271	79.1	1,173	70.0	326	47.0	4,615	63.2
Total outside major cities	1,651	19.4	601	21.0	512	30.4	369	53.1	2,691	36.8
Total, Ontario	8,501	100.0	2,872	100.0	1,685	100.0	695	100.0	7,306	100.0

¹Part of Ottawa, Hull, in Quebec.

SOURCE: Seccombe House, *The Canadian Medical Market, 1969*, Toronto, 1969.

Appendix III

Health Goods and Services

TABLE A249
Admissions¹ per Bed,² Reporting Public General and Allied Special Hospitals,
Canada and the Provinces, 1954-1966

Year	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1954	25.4	17.2	21.3	25.4	34.3	19.5	26.2	25.6	34.0	30.7	27.0
1955	25.3	19.7	21.5	24.8	32.4	20.8	26.2	25.1	31.4	29.9	27.6
1956	25.8	20.0	21.2	27.0	32.9	21.6	26.1	24.6	30.9	32.0	28.5
1957	26.3	22.7	21.5	28.2	33.4	21.2	26.9	29.0	31.7	30.8	29.4
1958	25.8	24.9	22.5	28.7	32.0	19.6	27.3	29.8	28.6	31.6	29.0
1959	25.6	23.0	21.9	30.2	31.3	19.9	26.5	30.1	29.7	29.9	29.3
1960	26.7	28.4	21.7	31.4	32.8	22.5	26.4	29.5	29.2	30.4	29.8
1961	26.5	28.8	22.7	28.9	32.9	23.3	26.0	27.9	28.6	28.8	28.8
1962	26.1	28.8	23.4	27.5	29.8	23.9	25.4	26.9	28.0	27.6	30.1
1963	25.7	24.8	23.8	27.4	29.4	23.3	24.9	27.3	29.5	27.1	30.4
1964	25.7	22.4	24.1	27.2	29.0	24.3	24.6	27.7	28.7	26.0	30.8
1965	25.8	24.5	24.5	25.9	29.2	24.4	24.6	26.8	29.0	26.0	31.2
1966	25.4	23.0	25.2	26.1	29.0	23.5	24.5	27.7	29.0	25.2	30.1

¹Adults and children.

²Based on rated bed capacity.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. I, Queen's Printer, Ottawa, 1968, Table 14.

TABLE A250**Admissions¹ Reported, by Type of Hospital, Canada² and the Provinces, 1959**

	All hospitals	General and Allied Special			Mental	Tubercu- losis
		Total	General	Allied Special		
Canada	2,692,901	2,646,869	2,571,449	75,420	32,958	13,074
Newfoundland	47,089	45,731	45,364	367	670	688
Prince Edward Island	15,460	15,086	15,022	64	300	74
Nova Scotia	111,221	108,905	105,041	3,864	1,762	554
New Brunswick	99,817	97,694	97,143	551	1,331	792
Quebec	625,409	612,400	571,344	41,056	8,031	4,978
Ontario	900,766	886,335	868,384	17,951	11,203	3,228
Manitoba	161,560	159,457	157,772	1,685	1,399	704
Saskatchewan	193,399	191,452	191,115	337	1,466	481
Alberta	259,323	256,364	254,212	2,152	2,241	718
British Columbia	272,435	267,023	259,630	7,393	4,555	857

¹Adults and children only.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1959*, Vol. II, Queen's Printer, Ottawa, 1961, Table 6.**TABLE A251****Admissions¹ Reported, by Type of Hospital, Canada² and the Provinces, 1966**

	All hospitals	General and Allied Special			Mental	Tubercu- losis
		Total	General	Allied Special		
Canada	3,254,181	3,187,653	3,091,627	96,026	56,939	9,589
Newfoundland	66,496	65,115	63,204	1,911	878	503
Prince Edward Island	18,737	18,136	18,022	114	530	71
Nova Scotia	123,716	120,740	116,306	4,164	2,710	536
New Brunswick	109,878	107,284	105,782	1,502	1,823	771
Quebec	813,260	792,758	757,647	35,111	17,405	3,097
Ontario	1,086,604	1,064,837	1,033,206	31,631	19,545	2,222
Manitoba	176,825	174,723	170,946	3,777	1,441	661
Saskatchewan	212,612	211,210	210,207	1,003	1,030	372
Alberta	298,981	294,430	286,592	7,838	4,027	524
British Columbia	336,969	328,587	320,641	7,946	7,550	832

¹Adults and children only.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1966*, Vol. I, Queen's Printer, Ottawa, 1968, Table 9.

TABLE A252

Percentage Occupancy¹ by Type of Hospital, Canada² and the Provinces, 1959

	All hospitals	General	Allied Special	Mental	Tubercu- losis
Canada	89.5	78.7	85.6	109.9	78.0
Newfoundland	83.5	77.1	90.9	104.6	72.5
Prince Edward Island	73.4	63.0	76.5	87.7	66.6
Nova Scotia	82.3	75.5	65.0	93.8	80.1
New Brunswick	91.4	78.4	63.1	139.2	69.0
Quebec	86.8	74.2	82.5	105.7	87.2
Ontario	92.8	82.4	92.4	112.0	72.4
Manitoba	90.8	80.1	66.9	113.9	84.1
Saskatchewan	99.4	83.3	103.4	137.3	66.8
Alberta	87.2	78.9	108.0	102.9	67.8
British Columbia	89.0	79.7	83.6	107.5	82.9

¹Based on rated bed capacity; excludes newborn days and bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1959*, Vol. II, Queen's Printer, Ottawa, 1961, Table 11.

TABLE A253

Percentage Occupancy,¹ by Type of Hospital, Canada² and the Provinces, 1964

	General and Allied Special			Mental	Tubercu- losis
	Total	General	Allied Special		
Canada	80.6	80.1	83.6	106.4	72.2
Newfoundland	73.0	72.7	76.3	97.3	58.6
Prince Edward Island	66.4	65.7	83.9	85.4	58.9
Nova Scotia	75.5	79.2	72.7	92.8	66.2
New Brunswick	81.9	82.0	79.4	124.6	60.4
Quebec	80.9	78.8	87.8	111.6	82.4
Ontario	82.6	82.2	85.1	107.6	67.0
Manitoba	81.1	79.7	88.4	97.9	87.4
Saskatchewan	81.7	80.7	92.6	114.2	94.9
Alberta	75.7	77.9	67.7	97.3	52.4
British Columbia	82.7	83.3	71.4	98.1	76.8

¹Based on rated capacity and adults and children patient-days.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1964*, Vol. II, Queen's Printer, Ottawa, 1966, Table 11.

TABLE A254**Percentage Occupancy,¹ by Type of Hospital, Canada² and the Provinces, 1966**

	All hospitals	General	Chronic, convalescent, rehabilitation	Other	Mental	Tubercu- losis
Canada	81.3	80.1	90.9	61.9	100.0	68.2
Newfoundland	70.6	70.8	117.4	27.6	99.4	59.6
Prince Edward Island	70.0	70.2	64.3	—	85.7	50.6
Nova Scotia	77.3	77.6	91.6	58.1	87.6	66.9
New Brunswick	83.9	84.1	96.0	62.3	108.3	61.8
Quebec	80.3	77.9	91.7	62.7	108.4	74.2
Ontario	84.1	82.8	94.7	72.4	96.8	63.0
Manitoba	80.5	80.0	87.1	41.9	101.9	84.3
Saskatchewan	82.0	81.0	96.0	26.0	100.5	87.3
Alberta	76.6	74.9	84.1	53.7	94.8	59.7
British Columbia	84.7	84.5	88.6	75.4	94.5	65.7

¹Based on rated bed capacity; excludes newborn days and bassinets.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1966*, Vol. I, Queen's Printer, Ottawa, 1968, Table 13.**TABLE A255****Average Daily Number of Patients¹ Reported, by Type of Hospital, Canada² and the Provinces, 1959**

	All hospitals	General	Allied Special	Mental	Tubercu- losis
Canada	165,657.5	74,822.8	15,211.5	66,255.5	9,367.7
Newfoundland	2,822.9	1,467.8	83.6	873.0	398.5
Prince Edward Island	975.1	415.1	23.7	463.0	73.3
Nova Scotia	6,121.7	3,067.1	96.2	2,545.8	412.6
New Brunswick	5,049.6	2,593.1	78.3	1,853.1	525.1
Quebec	46,967.5	17,575.7	7,544.8	18,825.9	3,021.1
Ontario	54,636.5	25,213.5	4,372.8	22,589.0	2,461.2
Manitoba	9,380.4	4,247.2	436.7	3,878.6	817.9
Saskatchewan	10,251.1	5,190.4	238.9	4,379.7	442.1
Alberta	12,662.3	6,930.6	692.6	4,631.9	407.2
British Columbia	16,483.2	7,815.4	1,643.8	6,215.5	808.5

¹Adults and children only.²Includes Yukon and Northwest Territories.SOURCE: DBS, *Hospital Statistics, 1959*, Vol. II, Queen's Printer, Ottawa, 1961, Table 9.

TABLE A256

**Average Daily Number of Patients¹ Reported, by Type of Hospital,
Canada² and the Provinces, 1966**

	All hospitals	General	Allied Special	Mental	Tubercu- losis
Canada	179,052	90,716	19,467	65,311	3,558
Newfoundland	2,985	1,889	109	821	166
Prince Edward Island	880	485	19	341	35
Nova Scotia	6,226	3,681	132	2,183	230
New Brunswick	5,720	3,136	150	2,183	251
Quebec	50,597	21,662	7,937	19,913	1,085
Ontario	62,740	33,003	6,676	22,207	854
Manitoba	8,786	4,589	851	3,155	191
Saskatchewan	9,254	5,462	550	2,978	264
Alberta	15,135	7,239	2,118	5,536	242
British Columbia	16,482	9,332	916	5,994	240

¹Adults and children only.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. I, Queen's Printer, Ottawa, 1968, Table 12.

TABLE A257
**Cost per Patient-day,¹ Public General and Allied Special Hospitals Reporting Expenditure,
 Canada and the Provinces, 1954-1966**

Year	Canada	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1954	12.85	10.61	9.49	11.34	12.45	11.43	13.85	11.19	11.48	13.28	15.20
1955	14.05	12.96	11.65	13.83	14.21	12.70	14.79	12.18	13.29	14.56	16.33
1956	14.91	14.15	11.29	14.20	15.00	13.54	15.78	13.88	14.55	14.76	16.71
1957	16.11	17.70	12.19	15.08	16.35	14.42	17.02	15.22	15.91	16.69	18.08
1958	17.84	16.59	12.86	17.19	18.21	16.66	18.51	17.33	17.74	18.19	19.26
1959	18.88	17.55	13.90	18.52	19.89	16.39	20.30	19.31	19.14	17.33	21.58
1960	21.32	19.74	16.74	21.39	21.34	20.66	22.49	20.98	20.39	18.48	22.45
1961 ²	23.10	19.92	19.06	23.64	23.66	23.18	24.26	21.94	21.16	19.90	23.48
1962	24.82	21.15	18.81	25.37	25.55	25.16	26.22	22.82	22.82	21.32	24.89
1963	26.87	23.01	20.46	27.31	27.46	28.45	28.00	24.25	23.40	23.08	26.07
1964	29.18	26.27	22.69	29.35	28.68	32.39	29.84	25.63	25.62	24.27	27.45
1965	31.92	28.34	24.43	32.05	30.03	36.82	32.15	27.90	27.65	25.89	29.37
1966	36.06	32.22	26.61	34.00	32.25	43.96	35.69	31.33	30.52	29.07	31.54

¹Refers to adult, child and newborn patient-days.

²Includes Yukon and Northwest Territories for the first time.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. VI, Queen's Printer, Ottawa, 1968, Table 2.

TABLE A258
Estimated Total Revenue Fund Expenditure of All Public General and Allied Special Hospitals,
Canada¹ and the Provinces, 1959-1966
 (thousands of dollars)

	1959	1960	1961	1962	1963	1964	1965	1966
Canada	541,730	622,413	699,137	781,766	884,392	987,931	1,113,200	1,281,787
Newfoundland	9,965	11,310	11,628	12,388	14,294	17,903	21,172	24,139
Prince Edward Island	2,286	2,754	3,239	3,344	3,592	3,983	4,302	4,892
Nova Scotia	18,489	22,042	24,882	27,355	30,512	34,260	37,603	41,396
New Brunswick	17,303	20,843	23,964	26,068	28,998	31,077	32,907	35,729
Quebec	134,154	154,978	180,589	206,683	250,355	286,369	339,310	402,149
Ontario	196,627	230,139	260,398	292,644	325,181	362,726	401,412	457,041
Manitoba	28,037	31,701	36,039	38,827	42,900	45,379	49,455	55,851
Saskatchewan	39,091	41,954	42,053	45,775	48,203	52,925	57,502	62,381
Alberta	43,318	47,229	51,288	58,373	64,892	72,524	80,356	94,468
British Columbia	52,460	59,463	64,334	69,085	74,191	79,501	87,889	102,337

¹Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. VI, Queen's Printer, Ottawa, 1968, Statement 2.

TABLE A259
Selected Services, Public General and Allied Special Hospitals, Canada¹ and the Provinces, 1959

	Autopsies ²	Obstetrical deliveries	Units of laboratory work	Operations	Radiation treatments	Radiology films taken
Canada	26,732	426,691	43,598,628	1,237,316	219,559	9,225,905
Newfoundland	484	11,888	506,940	20,429	6,138	181,297
Prince Edward Island	181	2,748	259,331	7,753	1,357	43,330
Nova Scotia	770	18,628	928,088	54,445	25,554	485,747
New Brunswick	494	15,516	466,252	48,479	13,663	354,447
Quebec	5,247	102,923	10,018,381	279,194	100,973	1,802,167
Ontario	9,186	153,490	16,275,613	417,850	34,231	3,756,355
Manitoba	2,403	21,730	2,548,189	72,281	—	506,953
Saskatchewan	2,229	23,605	3,840,819	86,354	335	698,749
Alberta	2,416	36,631	4,314,328	101,892	3,806	505,166
British Columbia	3,310	39,041	4,427,368	148,053	33,502	884,867

¹Includes Yukon and Northwest Territories.

²Units are laboratory standard units. (See Introduction to source, work done for inpatients only.)

SOURCE: DBS, *Hospital Statistics, 1959*, Vol. II, Queen's Printer, Ottawa, 1961, Tables 21, 20, 2, 19, 16 and 12.

TABLE A260
Selected Services, Public General and Allied Special Hospitals, Canada¹ and the Provinces, 1966

	Autopsies	Obstetrical deliveries	Units of laboratory work ^{2, 3}	Operations ³	Radiation treatments	Radiology examinations ³
Canada	38,651	377,108	162,005,218	2,685,509	337,572	7,488,198
Newfoundland	711	13,123	3,189,726	34,286	7,989	188,679
Prince Edward Island	140	2,224	469,170	10,461	468	43,671
Nova Scotia	1,066	15,411	3,454,525	116,788	29,565	394,226
New Brunswick	930	12,986	1,210,588	88,434	1,459	217,149
Quebec	8,212	103,319	56,044,631	666,510	168,959	2,283,061
Ontario	14,783	130,699	56,633,789	998,133	79,577	2,636,413
Manitoba	3,417	17,853	6,927,367	129,023	—	258,201
Saskatchewan	2,681	18,784	9,550,850	155,408	—	455,710
Alberta	2,170	29,880	10,167,672	196,791	1,574	425,845
British Columbia	4,528	32,341	14,295,022	286,128	48,031	576,069

¹Includes Yukon and Northwest Territories.

²Units are laboratory standard units. (See Introduction to source.)

³Services provided to inpatients and outpatients.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. II, Queen's Printer, Ottawa, 1968, Tables 13, 12, 2, 11, 10 and 7.

TABLE A261
**Units of Selected Special Services to Inpatients Attending Specific Unit in Reporting Public General
 and Allied Special Hospitals, Canada¹ and the Provinces, 1964**

	Occupational therapy	Physio- therapy	Speech therapy	Electro- shock therapy	Electro- cardio- graphy	Electro- encephalo- graphy	Physical medicine
Canada	731,942	3,444,714	28,954	60,308	737,268	48,812	165,618
Newfoundland	9,402	45,912	—	118	5,328	455	1,530
Prince Edward Island	3,060	18,377	—	41	3,853	—	—
Nova Scotia	7,244	76,477	224	1,502	25,110	1,711	2,205
New Brunswick	3,169	58,903	—	2,601	24,922	—	—
Quebec	93,363	629,479	4,223	9,679	256,639	20,341	31,652
Ontario	405,626	1,370,409	19,832	31,559	240,062	15,606	4,759
Manitoba	68,987	280,851	1,420	4,928	38,765	3,642	22,687
Saskatchewan	16,892	214,297	688	1,646	43,271	2,042	245
Alberta	62,964	344,693	1,614	4,541	47,617	3,125	1,639
British Columbia	61,235	404,538	953	3,693	51,639	1,890	100,901

¹Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1964*, Vol. II, Queen's Printer, Ottawa, 1966, Table 15.

TABLE A262
**Percentage of Reporting General and Allied Special Hospitals Providing Special Services,
 Canada¹ and the Provinces, 1966**

	Hospitals reporting	Occupational therapy	Physio- therapy	Speech therapy	Electro- shock therapy	Electro- cardio- graphy	Electro- encephalo- graphy	Social services	Emer- gency	Physical medicine
Canada	1,027	12.8	49.0	7.0	9.3	84.3	9.0	13.1	81.3	5.4
Newfoundland	47	6.4	21.3	—	6.4	34.0	4.3	8.5	23.4	2.1
Prince Edward Island	9	11.1	77.8	—	—	77.8	22.2	—	77.8	—
Nova Scotia	47	6.4	57.4	4.3	14.9	91.5	12.8	12.8	91.5	4.3
New Brunswick	39	5.1	48.7	—	5.1	89.7	7.7	5.1	79.5	—
Quebec	170	12.9	59.4	12.4	11.2	88.2	19.4	25.3	72.4	11.8
Ontario	221	26.7	69.2	14.9	18.6	94.1	11.8	22.2	86.4	7.7
Manitoba	82	9.8	29.3	4.9	6.1	95.1	4.9	11.0	97.6	8.5
Saskatchewan	151	2.6	33.8	0.7	2.6	86.8	3.3	4.6	94.7	1.3
Alberta	142	9.9	34.5	3.5	4.2	79.6	4.9	2.8	78.2	2.8
British Columbia	109	13.8	56.9	5.5	7.3	73.4	3.7	10.1	79.8	1.8

¹Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. II, Queen's Printer, Ottawa, 1968, Table 14.

TABLE A263
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
by Type of Treatment, Canada² and the Provinces, 1959

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Ortho- paedic	Paed.	Psych.	Tuber- cular	Isol.	Long- term	Rehab.	Other
Canada	97,610	100.0	54.7	12.8	2.3	11.3	1.4	0.7	1.7	10.7	—	4.4
Newfoundland	1,960	100.0	60.4	8.1	6.6	9.2	0.2	3.7	2.5	7.8	—	1.6
Prince Edward Island	690	100.0	62.8	12.0	5.1	10.3	—	—	2.8	7.1	—	—
Nova Scotia	3,350	100.0	65.5	15.6	0.8	13.4	0.7	—	0.6	0.4	—	2.9
New Brunswick	2,943	100.0	59.9	16.2	2.1	15.6	0.9	—	0.9	2.6	—	1.8
Quebec	28,630	100.0	46.9	9.8	3.1	10.8	1.6	1.1	2.5	17.5	—	6.6
Ontario	31,491	100.0	57.3	13.4	1.3	9.2	1.5	—	1.1	11.6	—	4.8
Manitoba	4,906	100.0	52.0	14.8	2.0	12.8	2.4	—	1.4	8.8	—	5.7
Saskatchewan	6,401	100.0	59.9	16.0	1.8	14.1	1.7	0.1	2.0	3.5	—	1.0
Alberta	8,228	100.0	55.3	14.6	3.3	13.9	1.0	—	1.5	9.1	—	1.3
British Columbia	8,388	100.0	62.0	14.8	2.9	13.4	0.9	—	1.7	0.7	—	3.6

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1959*, Vol. I, Queen's Printer, Ottawa, 1961, Tables 20 and 22A.

TABLE A264
**Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
 by Type of Treatment, Canada² and the Provinces, 1960**

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Ortho- paedic	Paed.	Psych.	Tuber- cular	Isol.	Long- term	Rehab.	Other
Canada	98,669	100.0	56.1	12.4	2.2	12.2	1.4	0.3	1.7	8.3	—	5.3
Newfoundland	1,918	100.0	63.8	7.5	6.4	10.2	0.2	2.7	3.0	3.8	—	2.4
Prince Edward Island	649	100.0	57.6	13.3	4.3	15.6	—	—	2.9	1.8	—	4.5
Nova Scotia	3,568	100.0	64.0	15.4	0.3	15.4	0.7	—	0.5	0.4	—	3.3
New Brunswick	3,156	100.0	58.1	15.1	1.7	16.3	1.2	—	2.3	1.2	—	4.1
Quebec	25,171	100.0	52.7	10.6	3.2	11.4	1.8	0.9	2.6	11.9	—	4.9
Ontario	33,542	100.0	56.2	12.7	1.2	10.4	1.4	—	0.8	10.6	—	6.7
Manitoba	5,405	100.0	51.8	13.4	1.8	13.1	2.3	0.4	2.4	11.0	—	3.8
Saskatchewan	7,363	100.0	59.5	12.2	0.9	14.4	1.4	0.1	1.9	0.1	—	9.5
Alberta	8,805	100.0	55.7	13.8	4.0	13.5	1.0	—	1.4	8.4	—	2.2
British Columbia	8,893	100.0	60.1	13.6	2.9	14.6	0.8	—	2.2	1.8	—	4.0

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1962*, Vol. I, Queen's Printer, Ottawa, 1962, Tables 20 and 23B.

TABLE A265
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
by Type of Treatment, Canada² and the Provinces, 1961

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Ortho- paedic	Paed.	Psych.	Tuber- cular	Isol.	Long- term	Rehab.	Other
Canada	102,461	100.0	54.9	12.4	2.1	13.2	1.6	0.4	1.6	5.2	—	8.6
Newfoundland	1,982	100.0	54.5	10.3	5.9	16.3	0.4	2.1	3.0	0.9	—	6.6
Prince Edward Island	649	100.0	59.5	13.5	4.3	15.6	—	—	3.4	3.7	—	—
Nova Scotia	3,706	100.0	62.2	16.7	0.3	15.1	1.0	—	1.7	—	—	3.0
New Brunswick	3,272	100.0	57.4	15.0	1.9	17.8	1.1	—	1.6	1.1	—	4.1
Quebec	26,112	100.0	50.9	11.0	3.1	14.4	1.7	1.5	2.4	8.2	—	6.8
Ontario	35,072	100.0	55.7	12.5	1.1	10.5	1.7	—	0.7	3.8	—	14.0
Manitoba	5,672	100.0	49.4	12.9	1.7	12.4	3.9	0.4	1.6	13.7	—	4.0
Saskatchewan	7,392	100.0	59.5	12.1	0.8	14.5	1.5	0.1	1.8	—	—	9.7
Alberta	9,174	100.0	53.9	13.4	3.9	13.1	0.9	—	1.4	8.3	—	5.1
British Columbia	9,289	100.0	60.0	13.1	2.1	15.6	0.8	—	2.0	2.2	—	4.2

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1961*, Vol. I, Queen's Printer, Ottawa, 1963, Table 17.

TABLE A266
**Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
 by Type of Treatment, Canada² and the Provinces, 1962**

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Paed.	Psych.	Tuber- cular	Isol.	Inten- sive care	Chron. conv. get.	Rehab.	Other
Canada	106,983	100.0	57.3	12.2	13.7	1.6	0.5	1.5	0.4	10.5	1.0	1.3
Newfoundland	2,122	100.0	59.3	11.7	18.6	0.3	2.3	2.6	0.1	2.9	2.2	—
Prince Edward Island	674	100.0	60.3	13.1	14.9	—	—	2.4	1.5	3.6	4.2	—
Nova Scotia	3,812	100.0	62.9	16.0	14.4	1.7	—	1.7	0.8	1.4	0.5	0.6
New Brunswick	3,441	100.0	58.3	15.3	18.0	1.4	—	2.2	0.2	3.8	0.6	—
Quebec	27,641	100.0	55.1	11.1	13.9	1.6	1.7	2.2	0.2	9.0	0.5	4.7
Ontario	36,690	100.0	57.3	12.1	12.1	1.6	—	0.5	0.5	15.1	0.7	0.1
Manitoba	5,941	100.0	52.2	12.2	12.4	4.1	—	1.7	0.7	13.3	2.7	0.7
Saskatchewan	7,386	100.0	61.4	12.2	14.7	1.6	—	1.8	0.4	6.7	1.2	—
Alberta	9,644	100.0	55.0	12.9	13.7	0.8	—	1.4	0.2	15.2	0.8	—
British Columbia	9,354	100.0	63.3	13.0	15.7	0.9	0.3	2.1	—	2.4	2.3	—

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1962*, Vol. I, Queen's Printer, Ottawa, 1964, Table 19.

TABLE A267
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
by Type of Treatment, Canada² and the Provinces, 1963

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Paed.	Psych.	Tuber- cular	Isol.	Inten- sive care	Chron. conv. ger.	Rehab.	Other
Canada	112,353	100.0	56.5	11.8	13.6	1.6	0.5	1.3	0.5	11.7	0.9	1.6
Newfoundland	2,435	100.0	58.4	10.7	16.8	0.3	1.4	2.4	0.1	2.5	2.0	5.4
Prince Edward Island	629	100.0	57.8	13.4	16.4	—	—	2.5	1.6	3.8	4.5	—
Nova Scotia	4,026	100.0	62.5	16.4	15.6	1.5	—	1.4	0.8	1.3	0.5	—
New Brunswick	3,578	100.0	60.0	14.4	17.2	1.3	—	2.1	0.1	3.8	1.1	—
Quebec	29,634	100.0	52.4	10.9	14.4	1.6	1.6	2.1	0.2	11.3	0.5	5.0
Ontario	38,549	100.0	57.0	11.6	11.9	1.6	—	0.1	0.7	16.8	0.3	—
Manitoba	6,027	100.0	53.1	11.5	12.4	4.9	—	1.6	0.6	13.3	2.6	—
Saskatchewan	7,521	100.0	60.2	12.1	14.7	1.7	—	1.9	0.6	5.9	2.1	0.8
Alberta	10,135	100.0	55.2	12.5	12.2	1.0	—	1.0	0.5	15.5	1.0	1.1
British Columbia	9,513	100.0	63.5	12.5	15.8	1.0	0.3	2.2	—	2.1	2.6	—

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1963*, Vol. I, Queen's Printer, Ottawa, 1965, Table 18.

TABLE A268
**Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
 by Type of Unit, Canada² and the Provinces, 1964**

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Paed.	Psych.	Tuber- cular	Isol.	Inten- sive care	Chron. conv. ger.	Rehab.	Other
Canada	115,403	100.0	57.1	11.5	13.9	1.6	0.1	1.1	0.6	12.8	1.2	0.1
Newfoundland	2,499	100.0	61.4	12.3	17.0	0.3	1.8	2.5	0.1	2.6	2.0	—
Prince Edward Island	629	100.0	57.5	13.5	16.8	—	—	2.4	1.6	3.7	4.5	—
Nova Scotia	4,082	100.0	62.4	15.7	16.0	1.5	—	1.8	0.8	1.3	0.5	—
New Brunswick	3,659	100.0	62.2	13.0	18.2	1.2	—	0.3	—	4.0	1.1	—
Quebec	29,460	100.0	55.4	10.8	15.7	1.6	0.1	2.0	0.5	13.3	0.6	—
Ontario	40,359	100.0	57.2	11.0	12.1	1.6	—	0.1	0.8	17.0	0.2	—
Manitoba	6,021	100.0	54.7	11.8	13.0	2.7	—	1.0	0.6	13.5	2.7	—
Saskatchewan	7,733	100.0	60.8	11.6	14.6	2.3	—	1.8	0.4	5.9	1.8	0.8
Alberta	10,958	100.0	51.4	11.4	11.5	0.9	—	0.9	0.5	20.3	3.1	—
British Columbia	9,706	100.0	63.3	12.2	14.9	1.1	0.3	2.1	0.1	2.6	3.4	—

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1964*, Vol. I, Queen's Printer, Ottawa, 1966, Table 18.

TABLE A269
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
by Type of Treatment, Canada² and the Provinces, 1965

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Paed.	Psych.	Tuber- cular	Isol.	Inten- sive care	Chron. conv. ger.	Rehab.	Other
Canada	118,260	100.0	56.9	11.1	13.7	1.6	0.1	1.1	0.7	13.4	1.3	0.1
Newfoundland	2,624	100.0	62.0	12.3	16.9	0.9	1.9	2.3	0.1	2.4	1.2	—
Prince Edward Island	629	100.0	56.0	14.5	16.8	—	—	2.4	2.2	3.7	4.4	—
Nova Scotia	4,306	100.0	62.2	14.7	17.2	1.4	—	1.5	1.3	1.2	0.5	—
New Brunswick	3,680	100.0	62.7	12.7	18.0	1.2	—	0.3	—	4.0	1.1	—
Quebec	30,720	100.0	54.6	10.2	14.8	1.7	0.1	2.0	0.6	15.3	0.7	—
Ontario	40,821	100.0	57.4	10.8	12.2	1.7	—	0.1	1.0	16.2	0.6	—
Manitoba	6,101	100.0	54.8	11.7	13.1	2.8	—	1.0	0.7	13.2	2.7	—
Saskatchewan	7,751	100.0	61.2	11.2	14.7	2.2	—	1.8	0.5	5.9	1.7	0.8
Alberta	11,089	100.0	50.8	11.0	11.5	1.1	—	0.9	0.5	21.2	3.0	—
British Columbia	10,275	100.0	61.2	11.4	14.3	1.2	0.1	2.0	0.2	5.5	4.1	—

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1965*, Vol. I, Queen's Printer, Ottawa, 1967, Table 18.

TABLE A270
Percentage Distribution of Beds Set Up¹ in Reporting Public General and Allied Special Hospitals,
by Type of Treatment, Canada² and the Provinces, 1966

	Beds set up Dec. 31	Total	Med. and surg.	Obste- tric	Paed.	Psych.	Tuber- cular	Isol.	Inten- sive care	Chron. conv. ger.	Rehab.	Other
Canada	122,555	100.0	57.0	10.6	13.5	1.8	0.1	1.1	0.8	13.3	1.4	0.4
Newfoundland	2,916	100.0	61.0	13.0	14.1	2.4	1.7	1.6	1.6	3.5	1.1	—
Prince Edward Island	626	100.0	55.9	14.7	16.9	—	—	2.4	2.2	3.7	4.2	—
Nova Scotia	4,377	100.0	62.6	14.6	17.0	1.4	—	1.4	1.1	1.2	0.7	—
New Brunswick	3,723	100.0	63.0	12.1	18.2	1.2	—	0.3	—	4.1	1.1	—
Quebec	31,364	100.0	55.4	9.9	14.1	1.9	0.1	2.0	0.7	15.2	0.6	0.1
Ontario	42,918	100.0	57.8	10.1	11.8	1.9	—	0.1	4.1	15.9	0.6	0.7
Manitoba	6,107	100.0	54.9	11.1	13.1	2.8	—	1.1	1.1	13.2	2.7	—
Saskatchewan	7,641	100.0	60.3	11.2	14.9	2.2	—	1.8	0.6	6.4	1.8	0.8
Alberta	11,882	100.0	49.7	10.3	12.8	1.2	—	1.0	0.6	20.5	3.9	—
British Columbia	10,710	100.0	60.7	11.1	14.3	1.4	0.1	1.8	0.2	5.8	3.9	0.7

¹Beds and cribs only; no bassinets.

²Includes Yukon and Northwest Territories.

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. I, Queen's Printer, Ottawa, 1968, Table 20.

TABLE A271
Breakdown of Hospital Services by Departments

General And Special Nursing Services

- Nursing units
- Nursing administration
- Operating room
- Delivery room
- Emergency unit
- Central supply room

Other Special Services

- Pharmacy
- Laboratory
- Radiology
- Physiotherapy
- Special Research projects
- Ambulance service
- Organized out-patient department
- Other

Supplemental Services

- Medical records and medical library
- Nursing education
- Medical education
- Social service
- Other

General Services

- Administration
- Dietary
- Laundry, linen service and housekeeping
- Operation and maintenance of physical plant
- Ancillary operations

TABLE A272

Percentage Distribution of Paid Hours during Year in Reporting Public General and Allied Special Hospitals, by Services, Canada and the Provinces, 1962

	Total hours	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	372,582,253	100.0	43.9	8.7	14.0	33.4
Newfoundland	3,658,883	100.0	28.4	12.0	22.3	37.3
Prince Edward Island	2,100,933	100.0	38.6	6.6	20.2	34.6
Nova Scotia	14,856,965	100.0	41.1	7.7	18.0	33.2
New Brunswick	13,659,743	100.0	45.7	5.2	14.3	34.8
Quebec	98,359,392	100.0	39.7	10.5	16.6	33.2
Ontario	137,981,926	100.0	45.5	8.3	13.0	33.2
Manitoba	20,423,415	100.0	43.7	7.9	16.7	31.7
Saskatchewan	22,011,642	100.0	44.5	8.9	12.3	34.3
Alberta	28,446,965	100.0	46.1	7.0	13.9	33.0
British Columbia	30,615,178	100.0	51.0	8.7	6.8	33.5

SOURCE: DBS, *Hospital Statistics, 1962*, Vol. III, Queen's Printer, Ottawa, 1964, Table 18.

TABLE A273

Percentage Distribution of Paid Hours during Year in Reporting Public General and Allied Special Hospitals, by Services, Canada and the Provinces, 1963

	Total hours	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	402,766,473	100.0	41.2	8.7	17.1	33.0
Newfoundland	5,597,884	100.0	30.7	9.4	25.5	34.4
Prince Edward Island	2,118,424	100.0	36.7	7.0	21.4	34.9
Nova Scotia	15,429,131	100.0	37.5	8.0	23.3	31.2
New Brunswick	14,306,716	100.0	43.7	5.0	17.0	34.3
Quebec	112,496,528	100.0	36.2	10.4	19.8	33.6
Ontario	146,348,629	100.0	44.1	8.5	14.7	32.7
Manitoba	21,774,929	100.0	43.5	8.0	18.0	30.5
Saskatchewan	22,666,860	100.0	41.4	9.0	16.1	33.5
Alberta	30,356,374	100.0	43.6	7.0	16.9	32.5
British Columbia	31,188,439	100.0	44.3	8.2	14.3	33.2

SOURCE: DBS, *Hospital Statistics, 1963*, Vol. III, Queen's Printer, Ottawa, 1965, Table 15.

TABLE A274

Percentage Distribution of Paid Hours during Year in Reporting Public General and Allied Special Hospitals, by Services, Canada and the Provinces, 1964

	Total hours	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	430,623,206	100.0	41.8	9.1	16.9	32.2
Newfoundland	6,443,929	100.0	31.3	8.9	25.9	33.9
Prince Edward Island	2,181,720	100.0	37.8	7.3	21.0	33.9
Nova Scotia	16,338,253	100.0	37.6	8.5	22.1	31.8
New Brunswick	14,958,696	100.0	43.1	5.1	18.4	33.4
Quebec	122,851,755	100.0	38.0	10.6	19.3	32.1
Ontario	155,549,143	100.0	44.3	9.2	14.4	32.1
Manitoba	22,274,599	100.0	44.1	8.2	17.3	30.4
Saskatchewan	24,100,833	100.0	42.0	9.2	15.8	33.0
Alberta	32,654,142	100.0	44.1	7.0	16.6	32.3
British Columbia	32,837,941	100.0	44.6	8.3	14.7	32.4

SOURCE: DBS, *Hospital Statistics, 1964*, Vol. III, Queen's Printer, Ottawa, 1966, Table 15.

TABLE A275

Percentage Distribution of Paid Hours during Year in Reporting Public General and Allied Special Hospitals, by Services, Canada and the Provinces, 1965

	Total hours	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	452,911,188	100.0	42.3	9.4	16.4	31.9
Newfoundland	7,793,973	100.0	34.9	8.6	23.7	32.8
Prince Edward Island	2,164,042	100.0	37.4	7.4	20.8	34.4
Nova Scotia	16,705,317	100.0	38.2	9.0	21.1	31.7
New Brunswick	15,094,320	100.0	42.9	5.4	18.3	33.4
Quebec	133,696,101	100.0	38.1	11.0	19.3	31.6
Ontario	160,999,460	100.0	44.9	9.5	13.8	31.8
Manitoba	23,129,760	100.0	44.7	8.5	16.8	30.0
Saskatchewan	24,659,419	100.0	42.9	9.4	15.0	32.7
Alberta	33,881,330	100.0	45.2	7.4	15.3	32.1
British Columbia	34,384,575	100.0	44.8	8.5	14.5	32.2

SOURCE: DBS, *Hospital Statistics, 1965*, Vol. III, Queen's Printer, Ottawa, 1967, Table 15.

TABLE A276

Percentage Distribution of Paid Hours during Year in Reporting Public General and Allied Special Hospitals, by Services, Canada and the Provinces, 1966

	Total hours	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	474,579,958	100.0	42.5	9.7	16.4	31.4
Newfoundland	8,439,786	100.0	34.9	9.0	23.2	32.9
Prince Edward Island	2,265,679	100.0	37.8	6.9	21.0	34.3
Nova Scotia	17,299,738	100.0	38.9	9.1	20.2	31.8
New Brunswick	15,395,712	100.0	43.4	5.2	18.2	33.2
Quebec	140,044,296	100.0	38.2	11.3	19.7	30.8
Ontario	168,918,593	100.0	45.0	9.9	13.9	31.2
Manitoba	24,059,667	100.0	45.2	8.6	16.9	29.3
Saskatchewan	24,730,470	100.0	43.0	9.6	14.7	32.7
Alberta	36,175,625	100.0	45.9	7.4	14.8	31.9
British Columbia	36,831,942	100.0	45.2	9.0	13.5	32.3

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. III, Queen's Printer, Ottawa, 1968, Table 12.

TABLE A277

Percentage Distribution of Reported Revenue Fund Expenditure by Services, Canada and the Provinces, 1964

	Total expenditure	Total	General and special nursing services	Other special services	Supplemental services	General services
Canada	983,568,166	100.0	37.5	13.8	6.3	35.3
Newfoundland	16,847,557	100.0	29.9	15.1	7.4	41.5
Prince Edward Island	3,983,248	100.0	33.7	12.7	6.4	38.0
Nova Scotia	34,260,429	100.0	35.2	15.8	6.9	34.4
New Brunswick	31,077,466	100.0	37.1	12.2	6.2	34.1
Quebec	286,369,124	100.0	34.4	16.4	7.7	34.2
Ontario	361,851,553	100.0	38.7	13.7	5.9	35.4
Manitoba	45,316,858	100.0	40.1	12.0	6.7	35.0
Saskatchewan	50,803,181	100.0	39.3	12.7	4.8	36.3
Alberta	72,509,756	100.0	39.1	9.4	5.0	36.3
British Columbia	79,418,071	100.0	41.5	10.9	5.0	36.8

SOURCE: DBS, *Hospital Statistics, 1964*, Vol. VI, Queen's Printer, Ottawa, 1966, Table 6.

TABLE A278
Percentage Distribution of Reported Revenue Fund Expenditure by Services, Canada and the Provinces, 1965

	Total expenditure	Total	General and special nursing services	Other special services	Supplemental services	General services	Other non-departmental expenses
Canada	1,107,348,275	100.0	37.9	14.4	6.2	34.8	6.7
Newfoundland	20,447,527	100.0	29.9	14.8	7.4	40.9	7.0
Prince Edward Island	4,301,837	100.0	34.5	12.9	6.4	37.4	8.8
Nova Scotia	37,602,868	100.0	33.9	18.3	6.6	33.7	7.5
New Brunswick	32,777,703	100.0	37.3	13.2	6.3	33.2	10.0
Quebec	339,310,654	100.0	35.2	16.7	7.6	33.9	6.6
Ontario	400,322,359	100.0	39.1	14.3	5.7	34.8	6.1
Manitoba	49,387,253	100.0	41.2	12.4	6.0	34.4	6.0
Saskatchewan	54,877,751	100.0	39.8	12.9	4.7	35.6	7.0
Alberta	80,355,888	100.0	40.2	9.6	4.9	35.7	9.6
British Columbia	86,897,078	100.0	41.3	11.7	5.1	36.0	5.9

SOURCE: DBS, *Hospital Statistics, 1965*, Vol. VI, Queen's Printer, Ottawa, 1967, Table 6.

TABLE A279
Percentage Distribution of Reported Revenue Fund Expenditure by Services, Canada and the Provinces, 1966

	Total expenditure	Total	General and special nursing services	Other special services	Supplemental services	General services	Other non-departmental expenses
Canada	1,275,199,675	100.0	38.0	14.7	6.4	34.5	6.4
Newfoundland	23,771,058	100.0	30.1	14.6	7.7	40.0	7.6
Prince Edward Island	4,892,463	100.0	36.1	13.3	6.6	36.4	7.6
Nova Scotia	41,396,826	100.0	34.7	17.3	7.2	33.7	7.1
New Brunswick	35,728,696	100.0	37.8	13.2	6.1	33.4	9.5
Quebec	402,149,687	100.0	36.2	16.8	7.6	33.5	5.9
Ontario	453,310,416	100.0	38.9	14.7	6.2	34.5	5.7
Manitoba	55,778,232	100.0	41.3	12.5	6.1	34.2	5.9
Saskatchewan	60,202,534	100.0	39.9	13.0	5.2	35.4	6.5
Alberta	94,468,099	100.0	39.5	9.9	4.8	35.3	10.5
British Columbia	102,246,094	100.0	41.3	12.6	4.9	35.6	5.6

SOURCE: DBS, *Hospital Statistics, 1966*, Vol. VI, Queen's Printer, Ottawa, 1968, Table 7.

TABLE A280
Prescription Market,¹ New Prescriptions Only, Canada and the Provinces, 1964

	Rx written per working day	Rx written per working day per physician	Rx dispensed per working day	Rx dispensed per working day per physician	Total Rx written and dispensed per working day per physician
Canada	151,350	8.2	15,984	0.86	167,334
Newfoundland	1,998	8.3	288	1.20	2,286
Prince Edward Island	800	8.8	78	0.86	878
Nova Scotia	5,492	8.1	688	1.02	6,180
New Brunswick	3,490	8.1	296	0.68	3,786
Quebec	41,312	8.2	5,075	1.01	46,387
Ontario	54,470	7.8	8,502	1.21	62,972
Manitoba	7,663	8.3	190	0.21	7,853
Saskatchewan	8,417	10.0	342	0.40	8,759
Alberta	10,840	8.7	214	0.17	11,054
British Columbia	16,868	8.0	311	0.15	17,179

¹For definitions, see source.

SOURCE: Seccombe House, *The Canadian Medical Market by Counties*, Toronto, 1964.

TABLE A281
Estimated Sales of Prescribed Drugs by Retail Drugstores,
Canada¹ and the Provinces, 1953-1959
 (thousands of dollars)

	1953	1954	1955	1956	1957	1958	1959
Canada	48,818	52,108	59,503	71,849	84,501	90,285	106,469
Newfoundland	379	461	558	580	800	848	974
Prince Edward Island	187	213	241	233	300	322	365
Nova Scotia	1,527	1,796	2,104	2,118	2,819	2,939	3,243
New Brunswick	1,637	1,971	2,361	2,426	3,313	3,565	4,081
Quebec	11,406	12,808	14,547	16,628	20,236	22,638	27,185
Ontario	17,396	17,828	21,105	27,585	31,563	33,285	40,063
Manitoba	4,329	3,550	3,477	3,688	4,511	4,526	5,286
Saskatchewan	4,027	3,569	4,114	4,993	5,569	5,909	5,654
Alberta	3,576	4,652	4,680	6,273	7,190	7,543	8,991
British Columbia	4,268	5,153	6,182	7,166	8,032	8,522	10,395

¹Includes Northwest Territories.

SOURCE: Department of National Health and Welfare, *Expenditures on Personal Health Care in Canada 1953-1961*, Health Care Series Memorandum Number 16, Ottawa, March 1963, Table 25.

TABLE A282
Sales of Prescribed Drugs, Canada, 1960-1965
 (thousands of dollars)

1960	1961	1962	1963	1964	1965
107,300	112,800	114,600	128,000	137,600	149,100

SOURCE: J. E. Osborne, *The Economics and Costs of Health Care*, Department of National Health and Welfare Research and Statistics memo (unpublished).

TABLE A283
Graduate Nurses in Different Industries,¹ Canada and the Provinces, 1961

Industry	Canada	Newfound- land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Agriculture	—	—	—	—	—	—	—	—	—	—	—
Forestry	—	—	—	—	—	—	—	—	—	—	—
Fishing and trapping	—	—	—	—	—	—	—	—	—	—	—
Mines, quarries, oil wells	69	4	—	1	—	36	14	—	2	6	4
Manufacturing	863	6	—	17	11	252	494	14	4	32	33
Construction	26	—	—	1	—	5	14	—	—	3	3
Transportation, communication and other utilities	115	1	—	1	2	51	35	7	3	2	13
Trade	157	—	—	3	1	28	61	11	2	20	31
Finance, insurance and real estate	83	—	1	2	1	14	49	5	—	8	3
Community, business and personal service	58,157	703	313	2,528	1,924	11,471	23,046	2,929	3,560	4,728	6,825
Public administration and defence	1,935	57	5	84	44	606	766	46	45	82	186

¹Classifications are major industry divisions from DBS, *Standard Industrial Classification Manual*, Queen's Printer, Ottawa, 1960.
 SOURCE: DBS, *Census of Canada, 1961*, Vol. III, Part 2, Queen's Printer, Ottawa, 1965, Table 15.

TABLE A284
Nurse's Aides and Assistants in Different Industries,¹ Canada and the Provinces, 1961

Industry	Canada	Newfound- land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Agriculture	—	—	—	—	—	—	—	—	—	—	—
Forestry ²	73	—	—	—	3	22	1	—	—	2	45
Fishing and trapping	—	—	—	—	—	—	—	—	—	—	—
Mines, quarries, oil wells ²	157	1	0	0	0	29	96	5	4	1	19
Manufacturing ²	544	0	0	3	5	70	1,076	1	0	3	256
Construction ²	80	2	0	1	0	10	8	1	6	7	45
Transportation, communication and other utilities ²	120	1	0	2	1	12	20	4	5	9	67
Trade ²	44	0	0	0	2	5	15	0	1	1	20
Finance, insurance and real estate	—	—	—	—	—	—	—	—	—	—	—
Community, business and personal service	60,662	1,075	317	1,908	2,071	13,819	23,338	3,886	3,130	4,657	6,345
Public administration and defence	574	26	5	28	27	112	250	12	17	38	57

¹Classifications are major industry divisions from DBS, *Standard Industrial Classification Manual*, Queen's Printer, Ottawa, 1960.

²Denotes "first-aid workers and other nursing assistants" rather than "nurse's aides and assistants".

SOURCE: DBS, *Census of Canada, 1961*, Vol. III, Part 2, Queen's Printer, Ottawa, 1965, Table 5.

TABLE A285

Expenditure on Organized Outpatient Departments as a Percentage of Special Services¹ Expenditure, Reporting Public General and Allied Special Hospitals, Canada and the Provinces, 1959-1966

	1959	1960	1961	1962	1963	1964	1965	1966
Canada	0.5	0.5	2.5	4.3	3.6	3.6	3.4	3.2
Newfoundland	0.9	0.6	4.6	5.2	5.0	4.9	4.3	4.3
Prince Edward Island	—	—	—	—	—	—	—	—
Nova Scotia	0.4	0.4	1.6	2.3	2.2	2.5	2.4	2.5
New Brunswick	—	—	—	—	—	—	—	—
Quebec	0.7	0.9	3.2	5.9	3.9	4.2	3.5	3.4
Ontario	0.6	0.5	2.5	4.1	3.9	3.7	3.7	3.4
Manitoba	0.6	0.8	4.1	6.8	7.0	7.5	7.8	7.5
Saskatchewan	0.1	0.1	0.4	0.6	0.6	0.5	0.5	0.4
Alberta	0.1	0.1	0.7	1.5	1.6	1.7	1.5	1.5
British Columbia	0.4	0.4	2.5	4.2	3.8	3.7	3.7	2.6

¹See Table A271 for a definition of Special Services.

SOURCE: DBS, *Hospital Statistics, 1966*, Volume VI, Queen's Printer, Ottawa, 1968, Table 7 (1965), Table 8 (1966).

TABLE A286

Trans-Canada Medical Plans, Percentage of Population in Each Area Served by Member Plans, 1956, 1965

Population 1965	Served by	Enrolment	Percentage of total population covered by T.C.M.P. plans	Percentage of total population covered by T.C.M.P. plans in 1956
British Columbia	Medical Services Association B.C. Medical Services Inc.	629,177 107,767	40.1	26.9
Alberta Saskatchewan	Medical Services (Alberta) Inc. (M.I.S.I. and J.M.S. reported in 1956 taken over by government since then)	699,592	48.0	15.0
Manitoba	Manitoba Medical Service	569,361	59.3	28.6
Ontario	Physicians' Services Inc., Windsor Medical Services, Inc.	1,785,363 270,211	31.3	16.1
Quebec	Quebec Hospital Service Ass'n. Les Services de Santé du Québec	876,316 244,081	19.6	13.6
Maritime Provinces Newfoundland Prince Edward Island Nova Scotia New Brunswick Yukon Northwest Territory	(Maritime Hospital Service Ass'n.) (Maritime Medical Care, Inc.)	320,823 179,587	25.1	19.6
Total		5,682,278	28.7	17.2

SOURCE: Trans-Canada Medical Plans, *Annual Experience Report*, Toronto, 1956 and 1965.

TABLE A287
Trans-Canada Medical Plans, Enrolment Growth by Plans, 1958-1965

Plan	December 31, 1958	December 31, 1959	December 31, 1960	December 31, 1961	December 31, 1962	December 31, 1963	December 31, 1964	December 31, 1965	Change 1958-1965
Maritime Medical Care, Inc.	110,380	128,990	136,700	136,057	147,590	165,516	176,577	179,587	62.70
Maritime Hospital Service	189,754	195,091	197,157	203,544	243,826	270,448	288,951	320,823	69.07
Les Services de Santé du Québec	—	—	—	—	—	194,289	214,104	244,081	
Quebec Hospital Service	644,227	680,895	679,659	742,116	766,167	804,910	843,598	876,316	36.02
Physicians' Services Inc.	866,962	1,246,221	1,258,397	1,411,525	1,641,382	1,861,516	1,997,093	1,785,363	105.93
Windsor Medical Services, Inc.	202,971	214,747	219,500	225,038	230,867	238,923	252,714	270,211	33.15
Manitoba Medical Service	306,873	346,046	369,706	399,711	439,775	491,917	540,483	569,361	85.54
Medical Services ¹ Inc.	192,351	211,514	214,002	217,795	—	—	—	—	
Group Medical ¹ Services	63,845	69,305	74,816	78,787	—	—	—	—	
Medical Services (Alberta)	345,243	421,207	452,909	513,643	578,646	628,290	643,772	699,592	102.64
Medical Services Ass'n.	427,929	467,939	479,118	487,225	508,870	538,053	584,682	629,177	47.03
B.C. Medical Services Inc.	37,633	41,261	57,608	69,511	87,581	108,888	135,099	107,767	186.36
Total	3,388,168	4,023,216	4,139,572	4,484,952	4,644,704	5,302,750	5,677,073	5,682,278	67.71 ²

¹Coverage taken over by government.²Totals include Medical Service Inc. and Group Medical Services in 1958, and Les Services de Santé du Québec in 1965.SOURCE: Trans-Canada Medical Plans, *Annual Experience Report*, Toronto, 1965.

TABLE A288
Trans-Canada Medical Plans, Summary of Costs¹ per Person per Annum, 1955-1965 (Comprehensive Plan)

Year	M.S.A.	M.S.(A).I.	M.S.I.	G.M.S.	M.M.S.	Name of Plan P.S.I.	W.M.S.	Q.H.S.A.	M.M.C.	M.H.S.A.	B.C.M.S.I.
1955	24.00	16.77	16.87	17.12	21.24	19.73	19.41	—	16.80	—	—
1956	21.37	17.02	16.68	17.06	21.74	21.20	22.38	—	16.88	—	—
1957	24.07	17.36	19.04	18.82	24.27	22.36	21.95	—	19.40	—	—
1958	25.00	20.64	19.53	20.90	25.55	23.23	22.59	—	18.33	—	—
1959	28.13	22.48	19.52	20.96	24.68	24.65	23.23	—	19.97	—	—
1960	29.37	24.84	20.51	21.44	27.88	26.38	24.14	—	—	17.21	29.14
1961	29.83	25.35	20.44	21.92	28.42	27.76	25.41	—	22.01	18.98	29.55
1962	30.47	26.91	—	—	29.89 } 31.49 }	30.60	26.64	—	21.97	19.31	30.05
1963	31.07	28.47	—	—	32.48	32.74	31.44	22.00	21.52	19.90	23.83
1964	32.71	29.92	—	—	30.18	33.56	31.38	22.84	21.55	20.01	35.09
1965	32.82	30.28	—	—	31.98	35.63	34.88	20.69	22.52	20.15	48.76

¹Based upon actual amounts paid to doctors for services provided.

SOURCE: Trans-Canada Medical Plans, *Annual Experience Report*, Toronto, 1965, Table V.

BINDING SEC. 1. JAN 14 1971

